Covering the TI99/4A and the Myarc 9640

MICROpendium

Volume 6 Number 7 August 1989 $2.00

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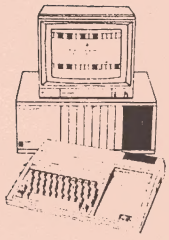

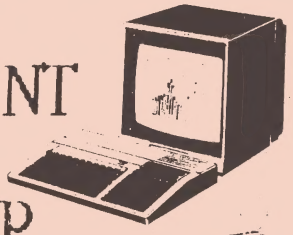

TEN YEARS AGO TEXAS INSTRUMENTS CREATED QUITE A STIR AT ELECTRONIC SHOWS AND IN THE TRADE PRESS WHEN IT ANNOUNCED THAT IT WOULD BE BRINGING A HOME COMPUTER TO THE CONSUMER MARKET. IT IS HARD TO BELIEVE IN THESE DAYS OF PC AND MACS THAT TEN YEARS AGO THE ONLY COMPUTERS AVAILABLE (AND AFFORDABLE) FOR THE HOME AND SMALL BUSINESS MARKET WERE PRIMITIVE PIECES OF EQUIPMENT DESIGNED FOR SKILLED USERS. TEXAS INSTRUMENTS TOOK A DIFFERENT APPROACH AND DEVELOPED A POWERFUL COMPUTER AND ACCESSORIES THAT COULD BE SOLD TO NEW USERS WITH NO COMPUTER OR ELECTRONIC BACKGROUND. IN ADDITION TO DESIGNING A POWERFUL COMPUTER WITH A COLOR DISPLAY AND A 16 BIT PROCESSOR WHICH WERE UNHEARD OF IN THIS PRICE RANGE, TEXAS INSTRUMENTS ALSO CREATED A FANTASTIC LIBRARY OF MODULE, DISK AND CASSETTE SOFTWARE USING THE BEST NAMES IN THE BUSINESS. LOOKING AT THE TI SOFTWARE LIBRARY IS LIKE LOOKING AT THE WHO'S WHO OF COMPUTERS, EDUCATION, BUSINESS AND GAMES. NAMES LIKE MICROSOFT, MILLIKEN, SCOTT FORESMAN, IMAGIC, SCOTT ADAMS AND THE LIST GOES ON AND ON.

UNLIKE MANY OF ITS COMPETITORS, THE TI-99/4A HAS WITHSTOOD THE TEST OF TIME AND REMAINS THE OVERALL BEST VALUE IN PRICE AND PERFORMANCE IN THE SMALL COMPUTER FIELD. FOR THIS REASON THERE ARE STILL THOUSANDS OF THESE POWERFUL COMPUTERS IN USE AND SUPPORTED BY THIRD PARTY HARDWARE, SOFTWARE AND ACCESSORY FIRMS AND NATIONAL RETAILERS AND A MONTHLY MAGAZINE.

TEX-COMP IS PLEDGED TO THE CONTINUED SUPPORT OF THE TI-99/4A AS DEMONSTRATED BY PUBLISHING THE LARGEST 99/4A CATALOG EVER WITH MANY ALL NEW PRODUCTS IN ADDITION TO MANY OF THE ALL TIME BEST. WHATEVER YOUR PARTICULAR APPLICATION IS, THE ODDS ARE THAT YOU WILL FIND IT IN THIS CATALOG. YOU WILL FIND THE BEST AVAILABLE IN EDUCATION, BUSINESS, WORD PROCESSING, DATA BASE MANAGEMENT, GAMES, GRAPHICS AND TELECOMMUNICATIONS ALONG WITH THE BEST SELECTION AND PRICES IN PRINTERS, MODEMS, MONITORS AND EXPANSION HARDWARE. ALL OF US AT TEX-COMP ARE 99/4A USERS SO IT WON'T GO IN THE CATALOG UNLESS IT IS RIGHT. OUR REPUTATION DEPENDS ON THIS AND WE DON'T WANT TO MESS WITH A REPUTATION THAT TOOK US TEN YEARS TO BUILD!

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MICROpendium

MICROpendium (ISSN 10432299) is published monthly for $20 per year by Burns-Koloen Communications Inc., 16606 Terrace Dr., Austin, TX 78728-1156. Second-class postage paid at Austin, Texas, and additional mailing offices. POSTMASTER: Send address changes to MICROpendium, P.O. Box 1343, Round Rock, TX 78680-1343.

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Programming conventions

Here are some tips to help you when entering programs from MICROpendium:
1. All BASIC and Extended BASIC programs are run through Checksum, the numbers that follow exclamation at the end of each program line. Do not enter these numbers or exclamation points. Checksum was published in the October 1987 edition.
2. Long XBASIC lines are entered by inputting until the screen stops accepting characters, pressing Enter, pressing FCTN REDO, cursoring to the end of the line and continuing input.

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TI Base	3:47:26	13:26	13:47

Sort Type: 2 field nested sort. (TI Sort can sort up to 8 fields)
File Type: Standard TI Base file.
File Size: 843 records; 80 characters per record in five fields.
Equipment Used: Standard TI-99/4a console attached to a peripheral expansion box containing a Myarc hard/floppy controller, two 6ms DS/DD floppy drives, 20 megabyte hard disk, and a Myarc 512K memory expansion card.

The table speaks for itself -- no hype, no miraculous claims. There is no faster. Period.

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Comments

Extend subscriptions to save money

Good news and bad news. The bad news first.

There's no more escaping it: The subscription price of MICROpendium is going up starting Oct. 15. All subscription categories will increase by $5 per year starting on that date. That means a standard, domestic subscription will increase from the current $20 per year to $25 per year. Canadian subscriptions will go from $27.50 to $32.50. And foreign air and surface subscribers can add $5 to their current rate.

We have to do this in order to keep publishing 48 pages a month. In the past we've cut the number of pages down to 40 during the summer, but we've remained at 48 this year. Our intention is to remain at 48, but it costs more. Our printing costs have increased, as well as other overhead items. The last subscription increase was in September 1987.

Bulk purchasers will also be paying 25 cents more per copy. The cover price will increase to $2.50. These prices will go into effect with the October edition. (Bulk purchasers who prepaid their orders a year in advance won't be rebilled at the new rate.)

Now for the good news.

Readers may extend their current subscriptions for 12 months at the current rates as long as we receive the check before Oct. 15. Please, don't try to renew for more than a year because we can't keep publishing 48 pages if we can't afford to pay the printer.

TENEX PLANS CATALOG

Tenex is including some TI products in its catalog published in August. However, it's nothing like the collection of TI products in previous Tenex catalogs. Last month I predicted there wouldn't be another Tenex catalog for the TI. I'd like to see the company remain in the TI market, even if in only a small way.

FLU TAKES TOLL ON REGENA

BASIC columnist Regena took August off, with the flu. Not much of a vacation for her, unfortunately. Her column will continue in September.

TIW FORMATTER AND LASER PRINTERS

Here's the problem: Running TI-Writer with a laser printer so that documents don't automatically advance at the top of the page. A reader asks if it there is a way to run the formatter so that each page starts with the first line. Using a page break causes the top-of-form advance on the subsequent page and he wants to use the entire page for copy. I've scanned our User Notes but haven't found a solution to the problem. A user note would be appreciated.

THOUGHTS ON ADVANCED BASIC

A final version of Advanced BASIC is still around the corner. Since it runs only with MDOS .95, which is incompatible with the Myarc Disk Manager, it can't be used with a hard disk. I've used both but I run them out of floppies (with the hard-disk turned off), just to be on the safe side. There aren't many Advanced BASIC programs out there — the one I've used is Jim Uzzell's Appointment Scheduler — but it is obvious that Advanced BASIC is much more powerful than Extended BASIC or Super Extended BASIC. The graphics, especially, are way beyond anything we've seen on the TI.

Unfortunately, there are no firm dates for final versions of Advanced BASIC, MDOS or Pascal Runtime.

Most of the questions we have for the Myarc Q&A column have to do with the specifics of Advanced BASIC, MDOS, and Geneve hardware. The problem with trying to answer the questions is that software specifications aren't finalized. So, an answer that is correct for one version may not hold when subsequent versions are available. Advanced BASIC is an example. The current beta test versions of the program in a number of ways do not reflect the documentation that came out with the Geneve. Readers who have written programs based on the manual tell me that they won't run with the real-world Advanced BASIC without modification. And, of course, the beta test versions don't come with updated manuals. A lot of time is thus wasted on trial and error as users discover the actual capabilities of the software. Not until there are finalized versions of Advanced BASIC and MDOS will software development really get under way. And the sooner that happens, the better.

—JK

UPCOMING TI FAIRS

SEPTEMBER

Central Illinois Computerfest Sept. 9 at Decatur Civic Center, Decatur, Illinois. For further information, call Helen Logan (217) 429-1809 or Jim Haws (217) 963-2607.

Gregg County Fair, Sept. 12-17 in Longview, Texas. Longview Computer Users Group to sponsor booth. For information, contact Leo W. DuBry, DuBry's Photography, 325 S. Center St., Longview, TX 75601.

TI International Expo 89 Sept. 16 at Howard Johnson Inn, 5821 Richmond Highway, Alexandria, Virginia. For further information write Mid-Atlantic Ninety-Nners, TI International Expo 89, P.O. Box 4005, Rockville, MD 20850, (301) 340-7179; or Delphi TI-NET, Teledata; or CompuServe, 74405,1207.

Fourth Annual TI99/4A Seattle Convention, Sept. 23-24 at Kenmore Flea Market in Kenmore, Washington. For further information contact Barb Wiederhold, (206) 361-0799 (voice) or (206) 361-0895.

OCTOBER

Fourth European Tref, begins at 10 a.m. Oct. 7 at Kolpinghuis, Nijmegen, The Netherlands. For information, contact Veriniging TI-Gebruikersgroep, Secretariaat: Dr. E.C. van Wette, Kremersmaten 106, 7511 LC Enschede, The Netherlands.

Australia TI Fair, 2-6 p.m. Oct. 14, Pavilion, Deepdene Park, Whitehorse Rd., Deepdene, Australia. For information contact TI99/4A Users Group — Melbourne Inc., 88 Main St., Blackburn, Victoria 3130, Australia.

3rd International TI-Users Meeting, 10 a.m.-6 p.m. Oct. 15 at Jugenderherberge Duisberg Wedau, Kalkweg 148, 4100 Duisberg 48, West Germany. For information contact TI-99er Workshop Rheinland, Dept. Allgemein & Software, c/o Mike Heuser, Karl-Marx-Allee 18, 5000 Cologne 71, West Germany, or the organizing committee at PCC, TI-Service, c/o Hans Greiffenberg, Großglocknerstr. 45, D-4100 Duisberg 28., West Germany.

Third Annual CPUG Computer Expo, 7 a.m.-2 p.m. Oct. 15 at Carlisle Fairgrounds on Clay Street in Carlisle, Pennsylvania. Sponsored by Central Pennsylvania 99/4A Users Group, co-sponsored by Cumberland County Amateur Radio Service and 6th Annual Cumberland County Hamfest. For information, contact Central Pennsylvania 99/4A Users Group, P.O. Box 14126, Harrisburg, PA 17104-0126 or the WIZ/TIB BBS, (717) 657-4992 or 657-4997.

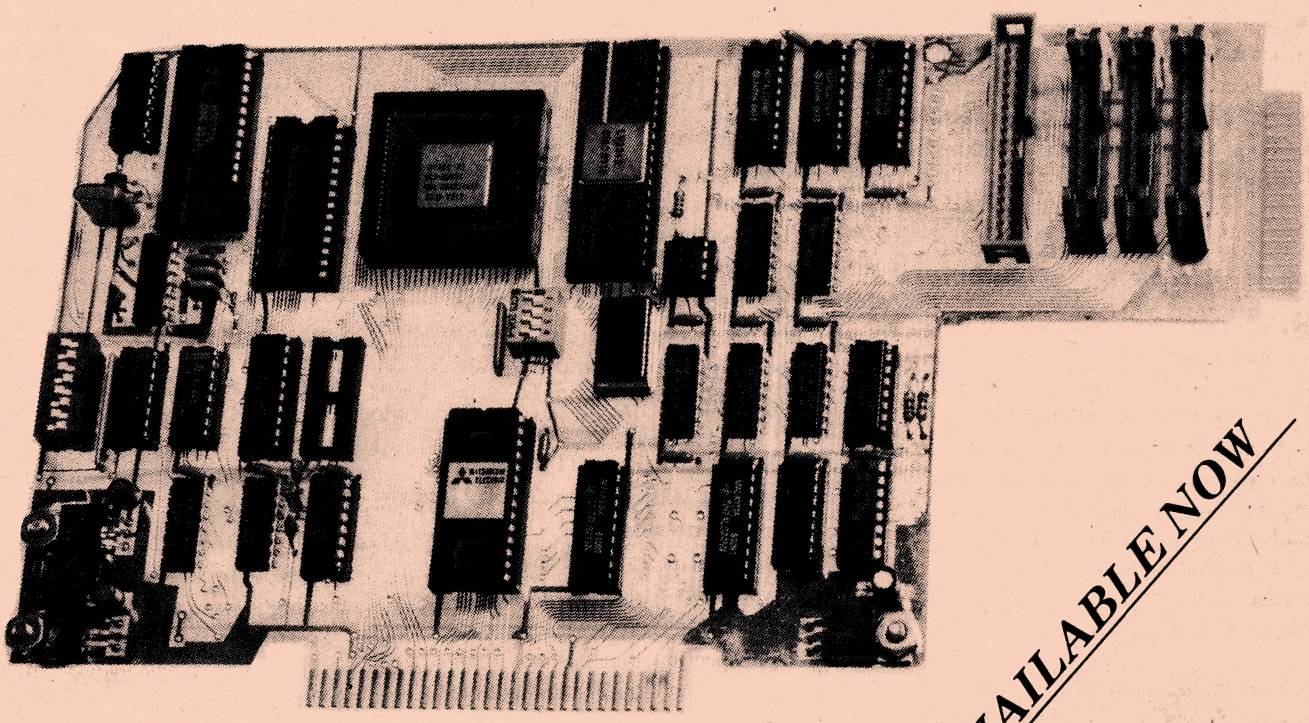
NOVEMBER

Chicago TI-Faire, 9 a.m.-5 p.m. Nov. 4 at Holiday Inn, 3505 Algonquin Rd., Rolling Meadows, Illinois. Social evening Nov. 3, dinner evening of Nov. 4. Sponsored by Chicago Area TI99/4A Users Group. For information contact Sandy Bartels, Chicago Area TI99/4A Users Group, P.O. Box 578341, Chicago, IL 60657 or (312) 859-3850.

Milwaukee TI-Faire, 9 a.m.-5 p.m. Nov. 5 at Quality Inn, 5311 S. Howell Ave., Milwaukee, Wisconsin (across from Mitchell Field Airport). For information call Gene Hitz, 4122 N. Glenway, Milwaukee, WI 53222 or (414) 535-0133.

This TI event listing is a permanent feature of MICROpendium. User groups and others planning events for TI/Geneve users may send information for inclusion in this standing column. When space is available, events will remain listed throughout the year for reference for the coming year.

THE MYARC Hard & Floppy Disk Controller with Streamer Tape Backup Support



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Feedback

On hardware voltage

The software I have ordered from the USA is pretty straightforward and works flawlessly, but I've been wary of purchasing hardware because of the different voltages.

I wonder if you could advise sometime how I would go on for repairs and whether some of the hardware is easy to convert. I was thinking of standalones and not items for the PEB.

D.H. Caine
Crewe, England

We would appreciate hearing from anyone who has experience in this. — Ed.

Manufacturer replies

In the January 1989 MICROpendium review of Picture-It, Ken Gilliland addresses a concern when defining several instances in the same session. He stated that the "preceding Instances sometimes contain errors." Ken was working with an early copy. The error mentioned was corrected early in 1988 in version 1.3.

My thanks to Harry Brashear for his March '89 mini-review of Form Shop and to Bill Gaskill for his June '89 full review. Both presented fair overviews of the product. They are correct that the documentation does not include TI-Writer information. A working knowledge of TI-Writer is necessary for full use of Form Shop. I was happily surprised to discover that it compares so favorably to similar IBM software.

Regarding printer compatibility, everyone seems to know that Form Shop prints using the IBM character mode found in newer printers. I would like to point out that Form Shop can utilize the block characters of the Gemini 10x and the Epson graphics mode found in almost all printers.

Users seem to overlook note 2 in the documentation. Forms printed using the IBM or Gemini 10x character sets need not have a line feed at the end of each line and may be printed by the TI-Writer formatter using "PIO.LF". For this reason, I left the default "PIO.LF". Forms using the Epson graphics (SETUPALL) must use "PIO.CR".

If you wish to purchase Form Shop, but your printer does not use IBM characters or Epson graphics, a setup file can be custom-made for your printer for a nominal charge.

Rodger Merritt
Comprodine
Fullerton, California

Not running in circles

From the merits of Gary Cox's review of the NX-1000 Star Printer (March 1989), I purchased my first printer for my TI99/4A. My enthusiasm slowly diminished as weeks went by with no output to the printer. I tried everything I could think of — only the printer's self-test would work. Presuming my new star printer was entirely compatible with the TI99 (why would they advertise and sell a printer in a catalog that specializes in TI hardware and software that wasn't compatible?), I looked for problems elsewhere.

My Multi-Com interface (from Triton products) wouldn't self test, so I shipped it back to Triton for tests. I wrote a letter to Asgard, suspecting that perhaps their software I was using was not compatible with the Multi-Com interface.

Lo and behold, in the July Feedback was the solution to my problem! The follow-up on the NX-1000 by Gary Cox! He said later versions of the NX-1000 are *not* compatible with the TI99/4A due to a quirk in the EPROM chip — my printer version is 2.1.

I called Star in Piscataway, New Jersey (on purchaser's record card) — no help — they referred me to the California number. Their 800 number (national technical support was disconnected. I called their 900 number and talked to "Jim" who said they were well aware of the problem and are in the process of developing a fix in the EPROM chip for the 2.1 version. This may come in a week or two — I'm to call back — and when the fix is ready, I'm to ship my EPROM to them in California, first, before they'll ship me the modified chip. This could go on another month!

My thanks to Gary Cox and MICROpendium. I'd still be going around in circles — now I see a solution, I hope.

Raymond C. Kiesling
Brookhaven, Pennsylvania

XBASIC problems

I have a silver and black pre-1983 console, P-Box with TI Disk Controller, two Teac half-height drives, TI RS232 and CorComp 32K memory. This system works fine in console BASIC and with most cartridges, including TI-Writer. My problem is that the system goes bonkers when attempting to use XBASIC (either TI's or Super). Sometimes the system will not start up at all when the XBASIC cartridge is inserted or when XBASIC is selected, or it might start but not complete the initial autoload, or it might complete the autoload, load the selected program from disk, start to run it and then freeze.

I have cleaned the contacts on the module.

I have since bought a slightly used pre-1983 console and tried it with my system. Results? No better. I replaced the RF Modulator with the one received with the new console with some improvement (in fact, last night was the first time I saw a third selection on the Super XBASIC menu), but I'm far from ready to say that the RF Modulator is the solution. I still have problems at times when I first power up. Sometimes, all I get is the selection for TI BASIC even with the XBASIC module in place. In fact, to some degree, the sickness had spread to TI-Writer. Is there any chance that CorComp memory or the connections to the P-Box could be causing the problems?

R.W. Walter
Glen Carbon, Illinois

Since the problem has been repeated on two consoles, and seem to be spreading, you need to look beyond cleaning the cartridge GROM contacts. You may need to replace the console GROM port. (See User Notes in this issue for an article on console fixes.) Try running the cartridges without the PEB turned on. If they work properly without the PEB, try running them with the PEB on but without expansion memory, etc. Make notes about the configurations that work and don't work. Through the process of elimination you may be able to isolate a cause. Readers with suggestions are encouraged to submit a user note. — Ed

EXTENDED BASIC

Building magnified sprites

By JERRY L. STERN
©J.L. Stern

Time to go back to school. Time to hit the books again, and get back to work. How depressing. The thought of going back indoors and sitting down to drudgery just doesn't appeal to me. Those drab, colorless halls and rooms, the dull, boring studying. I know that it could be just too much, unless. Yes, I suppose I could sneak some computer games into my worktime. Maybe something with lots of graphics. Big, bright graphics. Or maybe even big, moving graphics! Some sprite graphics would certainly brighten up some of that dull, boring workload.

Of course, defining sprite shapes could quickly become work. Let's see, one character on and three off; that's an eight. For big graphics I'll need big sprites; those are defined with four consecutive character patterns. That's 4 times 16, or 64 hexadecimal digits to figure out for each magnified sprite. This is getting depressing. One of my supposedly fun projects led me to manually calculate 39 different sprite shapes. By hand. Never again.

While searching for a program to calculate that hexadecimal mess, I came across the program called Character Definition in the TI User's Reference Manual. This was some years ago, back in the days of programs on cassettes and Bill Cosby doing television ads for something besides Jell-O. There was no commercial software available. Or shareware, or freeware. The Character Definition program wasn't all that bad. (It starts on page III-26 of the manual, if you want to take a look.) It was written in console BASIC, and so had no DISPLAY AT, or sprites, or any need to define more than one character at a time.

A magnified sprite needs not one, but four characters redefined. There just is no way to attempt that with the old TI program. SPRITE BUILDER started out as my way of expanding Character Definition so that it could handle four characters together, in Extended BASIC. It quickly grew beyond any but the remotest similarity in screen layout. I found a way to calculate how a sprite pattern changes when it is turned on its side, or reversed in colors, or flipped left to right. When I got my PEB and printer, I added the capability to convert the TI codes to Epson printer codes. While doing a large project, I found that even printouts weren't enough; I wanted to save the sprite shapes to disk files. That was added. Finally, here is the program that has been evolving for six years. SPRITE BUILDER as seen here now can do a graphics screen dump in addition to its previous abilities.

Finally, here is the program that has been evolving for six years. SPRITE BUILDER as seen here now can do a graphics screen dump in addition to its previous abilities.

I won't pretend that a program that has gone through as many changes as this one is perfectly structured. It isn't, but the seven subprograms help to keep it from getting completely entangled in itself. Most recently, when I added the screen dump facility, the same dump as published here in the June MICROpendium, I only had to MERGE in the subprogram and change about three lines to add the new feature. Without subprograms, these changes would have been far too difficult to make over the years.

Let's look at the subprograms first. The main program will tie these chunks together into a whole unit. Each of the subprograms can be used in other projects, of course, and have been.

DUMP3 and CHARPRT: This graphics screen dump routine was published in the June MICROpendium. It prints out the screen image as defined by the current character patterns stored in the TI character table for each ASCII character. This is a slightly changed version.

DUMP3 was designed for use where character definitions would remain unchanged between calls of the subprogram. Except for four characters, this is true here, too. Those four characters, ASCII numbers 132 to 135, are used to display the modified shapes created in the main program. The new line 28283 resets those four characters in the patterns list in DUMP3. That makes this subprogram call the subprogram CHARPRT to recalculate the Epson codes for those characters every time the screen dump is used. Because it must convert all the character codes on the screen, DUMP3 takes far more time to run the first time it is called than on subsequent passes.

However, the screen dump is not the only way to print out a character. Option 9 in the main menu will also print out the character pattern, as well as the EPSON codes needed to print it out, and a sample picture of the character.

SUBBER: Option 9 can also save the character to a disk file using the subprogram SUBBER. This routine creates a file of character patterns. Each pattern is saved as one DATA statement in a merge format program file. Effectively, SUBBER is a subprogram that creates other program portions. Each time SUBBER is called, it will save an additional line to the same disk file. This file of statements will begin at line 20000, but you can change that initial setting if you like, in line 150 of the main

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EXTENDED BASIC—

(Continued from Page 9)

program.

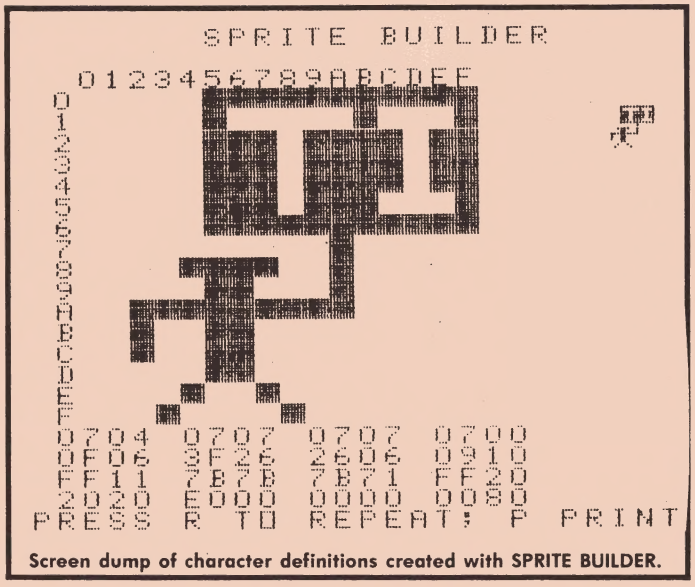
One warning about SUBBER: It does not complete its own file. That must be done by the main program. SPRITE BUILDER does that in line 740. Leave the disk in place until SPRITE BUILDER has returned control to Extended BASIC immediate mode. The program will print the end of file marker to the data file and then end the program. This technique is the reason that only one data file can be opened in each run of the program.

HD: This is the subprogram that prints out the large header picture of the new character when the Option 9 print routine is used. This is done very simply. For each dot in the character pattern, one dark block is printed, eight dots wide and seven dots high. Eight dots high would create a square, but not all of the TI and Epson compatible printers will print graphics codes above 127, or seven dots high. Rather, they could print them, but that involves flipping one DIP switch inside the printer and changing the printer name from "RS232.BA=____" to "RS232.BA=____.DA=8" That option sends eight data bits to the printer instead of seven. If you have the original printer, it's worthwhile — make the change!

There is one tricky bit to HD. The dots in the TI pattern are in a top to bottom and again top to bottom pattern in each of the four character patterns. HD corrects this by printing the 1st, 2nd, 17th, and 18th characters of the hexadecimal code on it's first pass, then coming back for the 3rd, 4th, 19th, and 20th, and so on.

WAIT and PAUSE: These are very simple subprograms that take functions that are needed in almost every application program, and standardize them, make them easier to type in. I just merge them in, and I'm done. I keep a file of subprograms just for this purpose, and it saves me an enormous amount of time on each project.

MG: This subprogram magnifies sprite patterns from single character size, or magnifications one and two, to quad size, or magnifications three and four. This is useful for making letters for display in programs for kids learning to read, or for anyone who may need large letters on the screen because of vision problems.



Screen dump of character definitions created with SPRITE BUILDER.

In magnification level two, sprites of single letters and numbers are two columns wide and two rows wide. By expanding the shape of that letter to a quad-sized sprite, with it's 64-digit hexadecimal code, it can be displayed in magnification level four as a letter four columns wide by four rows high. That's 16 times the size of normal screen letters.

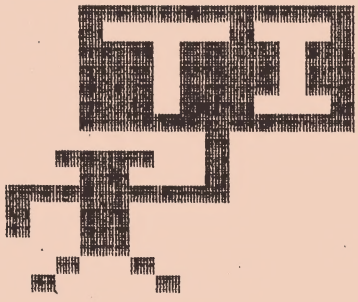
The conversion process is similar to that of the HD subprogam. Each digit of the single size sprite code is converted to four digits in the new quad size sprite. If the first digit of the old code is 1, for example, the first four digits of the new code will 0303. Each digit represents four dots in a row straight across. The rightmost dot alone is 1. The next dot is 2. Both combined, both dots turned "on," is three. So, if the old code was 1, or:

OFF OFF OFF ON

then the new code must be: 0303

OFF OFF OFF OFF OFF OFF ON ON

(See Page 12)



A second type of printed record of character patterns created by SPRITE BUILDER.

```
    TI SIGN HOLDER
0704 0707 0707 0700     0  0  0  0  0  254  190  190
0F06 3F26 2606 0910   130  190  191  254  186  130  186  254
FF11 7B7B 7B71 FF20     0  0  56  33  162  252  252  162
2020 E000 0000 0080    33  32  224  0  0  0  0  0
```

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BY PAUL CHARLTON

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EXTENDED BASIC—

(Continued from Page 10)

OFF OFF OFF OFF OFF OFF ON ON.

Again, the digits have to be converted in a different order than the original. First all the odd digits are expanded, and then all the even digits get the same treatment. That keeps all the proper dots in the same positions.

That covers all the subprograms; now let's look at the main program. SPRITE BUILDER stores the dot pattern being designed in a pair of arrays, B(16,16) and BB(16,16). These arrays are usually equal to each other. B is used as the primary array for the shape, and BB is used for turning the shape. The turn option of the main menu works by copying the contents of B into BB with columns and rows reversed, and then copying the result back to B again.

The other options are:

No. 1: Any Character — Quad Size. (Lines 320 to 330.) This uses the MG subprogam to magnify the existing shape of any of the ASCII characters available on the keyboard.

No. 2: Any Character — Single Size. (Lines 320 to 330, same as option 1.) This can be any character on the keyboard again, but in it's original size, and appearing in the upper left corner of the quad size shape display.

No. 3: Magnify an Old Pattern. (Lines 340 to 360.) This will allow a 16-character, or single size sprite code, to be typed in. MG will be used to expand it to quad size.

No. 4: Old Pattern — Unmagnified. (Lines 340 to 360, as in option 3.) The starting point will be typed in as a 64-digit quad sprite.

No. 5: New Character. (Line 370) Just a blank screen to fill as you choose. These first five options are starting points for new characters. The remaining options are for manipulating or saving or printing characters already worked with.

No. 6: Reverse Former Character. (Lines 310 to 330.) This one reverses the light and dark dots of the shape.

No. 7: Turn Former Character. (Line 290) The character is rotated ninety degrees in a counterclockwise direction. Turn again for upside down sprites, or twice more for 270 degree turns.

No. 8: Flip Former Character. (Line 300) This is a left to right reversal, or mirror image, of the original shape, as compared to number 7 performed twice, which is just upside down.

A top to bottom mirror image reversal can be done as well. Turn the image once with option 7, flip with option 8, and then turn with option 7 until the shape is facing in the correct direction.

No. 9: Print/Save Former Character. (Lines 850 to 1170) We've already looked at these routines, but a comment for those with non-Epson compatible printers. The screen dump will not work for you. You can, however, print the hexadecimal code to your printer. Use option 9, and answer "No" to the question "Print Sprite Pattern?" And for everybody with a printer, change the default in line 90 to match the name of your printer.

When using the "Save" option, SPRITE BUILDER creates a file containing the character definitions in DATA statements in a MERGE file. To use that file, first make room starting at line 20000 in your program. You may need to resequence to move the lines around, or change line 150 of SPRITE BUILDER to use a different value for LN, the starting line number of the DATA file. Once you've made sure the line numbers of the DATA file and your new program don't overlap, just combine the files with the merge command.

OLD DSK1.NEWPROJECT
MERGE DSK1.CHARFILE

That should make your new project ready for testing.

Well, I had better let you get started. Adding sprites to your programs should be enough to keep you going through the fall school season, but in case it isn't, try designing your own falling leaves sprites and falling snowflakes sprites. They're perfect for seasonal greetings programs for your fellow TI'ers. Whew! I see the holiday season is starting early again this year.

SPRITE BUILDER

```
90 P$="RS232.DA=8.BA=4800" !
041
100 ! SPRITEBUILDER V. 4.0 J
LS 8/89 !216
110 CALL SCREEN(12):: CALL M
AGNIFY(4):: ON BREAK NEXT ::
 ON WARNING NEXT !194
120 DATA 0,0,0,0,0,0,0,1,0,0
,1,0,0,0,1,1,0,1,0,0,0,1,0,1
,0,1,1,0,0,1,1,1 !108
130 CALL CHAR(128,"1F3067444
4673081FF0180CC04040CC18F000FF"
,138,"0",139,"0"):: CALL CLE
AR :: !052
140 DISPLAY AT(1,7)ERASE ALL
:"SPRITE BUILDER" :: CALL CH
AR(95,"00FF"):: CALL HCHAR(2
,9,95,14)!099
150 CALL WAIT :: LN=20000 !0
55
160 DIM B(16,16),BB(16,16),P
(16,4),TT(64)!084
170 CALL CHAR(136,"FEFEC6061
E380038010139F9E1C7FFC7",139
,"FFFFFFFFFFFFFFFF")!060180
CALL COLOR(14,2,16):: HX$="0
123456789ABCDEF" :: M$,K$=RP
T$("0",64)!148
190 DATA 1,0,0,0,1,0,0,1,1,0
,1,0,1,0,1,1,1,1,0,0,1,1,0,1
,1,1,1,0,1,1,1,1 !116
200 FOR L=0 TO 15 :: FOR M=1
 TO 4 :: READ P(L,M):: NEXT
M :: NEXT L !028
210 IF Q=2 THEN M$=SEG$(M$,1
,16)!180
220 DISPLAY AT(1,7)ERASE ALL
:"SPRITE BUILDER" :: CALL HC
HAR(2,9,95,14)!075
230 CALL DELSPRITE(#1):: DIS
PLAY AT(3,1):"Choose a start
ing point:": :"1 -ANY CHARAC
TER - QUAD SIZE" !129
240 DISPLAY AT(6,1):"2 -ANY
CHARACTER-SINGLE SIZE":"3 -M
AGNIFY AN OLD PATTERN":"4 -O
LD PATTERN-UNMAGNIFIED" !053
250 DISPLAY AT(9,1):"5 -NEW
CHARACTER":"6 -REVERSE FORME
R CHARACTER  (WHITE ON BLAC
K)":"7 -TURN FORMER CHARACTE
R" !153
260 DISPLAY AT(13,1):"  (TUR
N COUNTERCLOCKWISE)":"8 -FLI
P FORMER CHARACTER":"  (RIGH
T TO LEFT)":"9 -PRINT/SAVE F
ORMER CHAR.":"0 -QUIT" !084
270 CALL KEY(3,Q,S):: IF S<1
 THEN 270 ELSE IF Q<48 OR Q>
```

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EXTENDED BASIC—

(Continued from Page 12)

```
57 THEN 270 ELSE Q=Q-48 !011
280 ON Q+1 GOTO 720,320,320,
340,340,370,310,290,300,860
!169
290 CALL WAIT :: FOR R=1 TO
16 :: FOR C=1 TO 16 :: BB(C,
R)=B(R,17-C):: NEXT C :: NEX
T R :: FOR R=1 TO 16 :: FOR
C=1 TO 16 :: B(R,C)=BB(R,C):
: NEXT C :: NEXT R :: GOTO 3
80 !020
300 CALL WAIT :: FOR R=1 TO
16 :: FOR C=1 TO 8 :: T=B(R,
C):: B(R,C)=B(R,17-C):: B(R,
17-C)=T :: NEXT C :: NEXT R
:: GOTO 380 !146
310 CALL WAIT :: FOR R=1 TO
16 :: FOR C=1 TO 16 :: B(R,C
)=-(B(R,C)=0):: NEXT C :: NE
XT R :: GOTO 380 !170
320 DISPLAY AT(20,5)BEEP:"CH
ARACTER?" !028
330 CALL KEY(0,K,S):: IF S<1
 OR K<32 OR K>126 THEN 330 E
LSE CALL CHARPAT(K,M$):: GOT
O 380 !199
340 FOR L=1 TO 1-3*(Q=4):: D
ISPLAY AT(20+L,5):SEG$(M$,L*
16-15,16):: NEXT L !056
350 DISPLAY AT(20,5)BEEP:"HE
XADECIMAL STRING?" :: M$="" 
!028
360 FOR L=1 TO 1-3*(Q=4):: A
CCEPT AT(20+L,5)SIZE(-16)VAL
IDATE(HX$):T$ :: M$=M$&SEG$(
T$&K$,1,16):: NEXT L :: M$=M
$&K$ :: GOTO 380 !147
370 CALL WAIT :: FOR R=1 TO
16 :: FOR C=1 TO 16 :: B(R,C
)=0 :: NEXT C :: NEXT R !120
380 DISPLAY AT(1,8)ERASE ALL
:"SPRITE BUILDER" :: DISPLAY
 AT(3,3):HX$ !181
390 FOR L=1 TO 16 :: DISPLAY
 AT(3+L,2):SEG$(HX$,L,1):: N
EXT L !120
400 CALL WAIT :: IF Q=1 OR Q
=3 THEN CALL MG(M$)ELSE IF Q
=5 THEN 460 !083
410 IF Q>5 AND Q<9 THEN GOSU
B 630 :: GOSUB 670 :: GOTO 4
50 !222
420 GOSUB 660 !230
430 M$=M$&K$ :: FOR R=1 TO 1
6 :: FOR C=1 TO 13 STEP 4 ::
 T=ASC(SEG$(M$,(R*2+(C<5)+(C
>8)*-31+(C<13)+1),1))-48 ::
IF T>9 THEN T=T-7 !224
440 FOR M=0 TO 3 :: B(R,C+M)
=P(T,M+1):: CALL HCHAR(R+3,C
+4+M,B(R,C+M)+138):: NEXT M
:: NEXT C :: NEXT R :: GOTO
470 !144
450 FOR R=1 TO 16 :: FOR C=1
 TO 16 :: CALL HCHAR(3+R,C+4
,B(R,C)+138):: NEXT C :: NEX
T R :: GOTO 470 !036
460 FOR R=1 TO 16 :: CALL HC
HAR(3+R,5,138,16):: NEXT R !
095
470 DISPLAY AT(24,2)BEEP:"PR
ESS ENTER WHEN DONE." !078
480 FOR R=1 TO 16 :: FOR C=1
 TO 16 !099
490 CALL GCHAR(3+R,4+C,L)::
CALL HCHAR(3+R,4+C,136-(L=13
9))!057
500 CALL KEY(0,K,S):: IF S=0
 THEN 500 ELSE IF K=13 THEN
CALL WAIT :: GOSUB 620 :: GO
TO 690 !136
510 IF K>7 AND K<12 THEN GOS
UB 760 :: GOTO 490 !055
520 IF K=68 OR K=100 THEN K=
9 :: GOTO 560 !162
530 IF K=69 OR K=101 THEN K=
11 :: GOTO 560 !206
540 IF K=83 OR K=115 THEN K=
8 :: GOTO 560 !164
550 IF K<>88 AND K<>120 THEN
 570 ELSE K=10 !213
560 GOSUB 760 :: GOTO 490 !0
06
570 K=K-48 :: IF (K<0)+(K>1)
<=-1 THEN 500 !156
580 B(R,C)=K :: FL=1 !204
590 CALL HCHAR(3+R,4+C,138+K
):: NEXT C !129
600 IF R=16 THEN R=0 !126
610 NEXT R !232
620 CALL HCHAR(3+R,4+C,138+B
(R,C)):: IF FL=0 THEN RETURN
 !089
630 M$="" :: FOR M=0 TO 8 ST
EP 8 :: FOR R=1 TO 16 :: FOR
 L=0 TO 4 STEP 4 !213
640 H=B(R,M+L+1)*8+B(R,M+L+2
)*4+B(R,M+L+3)*2+B(R,M+L+4)+
1 !112
650 M$=M$&SEG$(HX$,H,1):: NE
XT L :: NEXT R :: NEXT M !06
0
660 FOR L=0 TO 3 :: FOR M=1
TO 4 :: DISPLAY AT(20+L,M*5-
3):SEG$(M$,L*16+M*4-3,4):: N
EXT M :: NEXT L !153
670 CALL CHAR(132,M$&K$):: C
ALL HCHAR(5,26,132):: CALL H
CHAR(6,26,133):: CALL HCHAR(
5,27,134):: CALL HCHAR(6,27,
135)!130
680 CALL SPRITE(#1,132,5,100
,200):: FL=0 :: RETURN !095
690 DISPLAY AT(24,1)BEEP:"PR
ESS R TO REPEAT; P PRINT" !0
91
700 CALL KEY(3,K,S):: IF S<1
 THEN 700 ELSE IF K=82 THEN
470 ELSE IF K<>80 THEN 210 !
229
710 CALL DUMP3(P$):: GOTO 69
0 !057
720 CALL SOUND(800,130,0,390
,0,160,0):: DISPLAY AT(24,3)
:"PRESS SPACE BAR TO QUIT" !
047
730 CALL KEY(0,K,S):: IF S<1
 THEN 730 ELSE IF K<>32 THEN
 210 !107
740 IF Z$="D" THEN OPEN #47:
W$,VARIABLE 163,DISPLAY ,APP
END :: PRINT #47:CHR$(255);C
HR$(255):: CLOSE #47 !234
750 CALL CLEAR :: STOP !235
760 CALL HCHAR(3+R,4+C,138+B
(R,C))!210
770 ON K-7 GOTO 780,800,820,
840 !031
780 C=C-1 :: IF C=0 THEN C=1
6 :: R=R-1 :: IF R=0 THEN R=
16 !130
790 RETURN !136
800 C=C+1 :: IF C=17 THEN C=
1 :: R=R+1 :: IF R=17 THEN R
=1 !132
810 RETURN !136
820 R=R+1 :: IF R=17 THEN R=
1 !031
830 RETURN !136
840 R=R-1 :: IF R=0 THEN R=1
6 !030
850 RETURN !136
860 DISPLAY AT(20,1):"PRINTE
R OR DISK FILE?  ";Z$ !140
870 ACCEPT AT(20,24)SIZE(-1)
VALIDATE("DP"):Z$ :: IF Z$="
```

(See Page 14)

EXTENDED BASIC—

(Continued from Page 13)

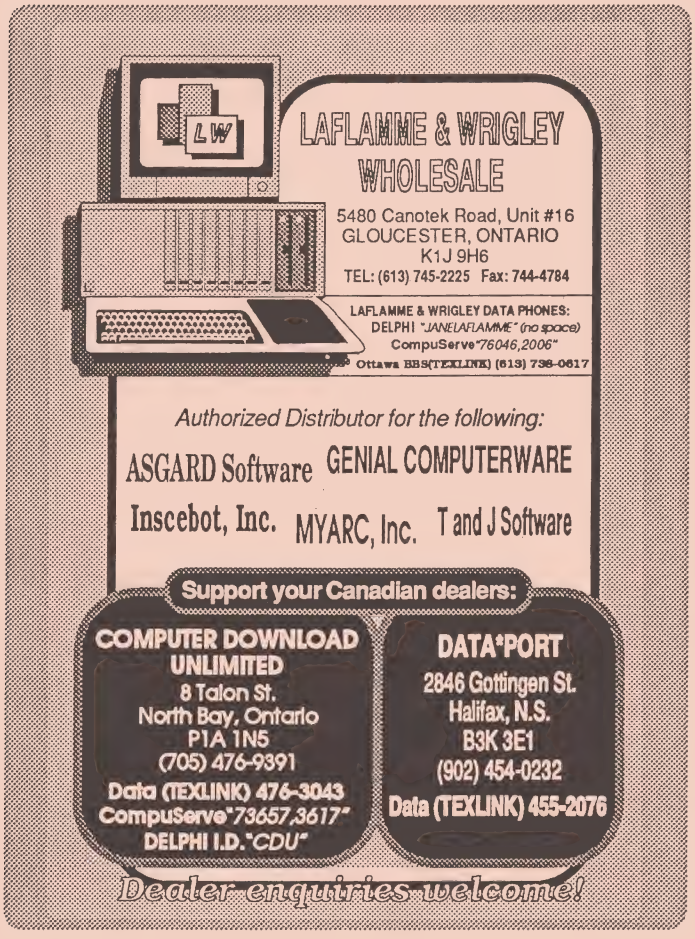
```
P" THEN 9ØØ !121
88Ø IF W$>"" THEN 89Ø ELSE D
ISPLAY AT(22,1):"FILE NAME?"
:"DSK1." :: ACCEPT AT(23,1)V
ALIDATE(UALPHA,DIGIT,".")SIZ
E(-14):W$ !Ø49
89Ø CALL SUBBER(W$,M$,LN)::
LN=LN+1Ø :: GOTO 21Ø !138
9ØØ DISPLAY AT(2Ø,1):"WHAT I
S THE PRINTER CALLED?":P$ !2
Ø9
91Ø ON ERROR 117Ø !159
92Ø ACCEPT AT(21,1)SIZE(-24)
:P$ :: IF P$="" THEN CALL HC
HAR(19,1,32,96):: GOTO 21Ø !
14Ø
93Ø DISPLAY AT(2Ø,1):"SPRITE
 NAME?":Y$ :: ACCEPT AT(21,1
)SIZE(-28):Y$ !198
94Ø DISPLAY AT(2Ø,1):"PRINT
SPRITE PATTERN? Y/N":S$ :: A
CCEPT AT(21,1)SIZE(-1)VALIDA
TE("YN"):S$ !ØØ8
95Ø IF LEN(M$)>64 THEN M$=SE
G$(M$,1,64)!Ø84
96Ø M$=M$&RPT$("Ø",64-LEN(M$
)):: IF SEG$(M$,17,48)=RPT$(
"Ø",48)THEN M$=SEG$(M$,1,16)
!151
97Ø FOR L1=1 TO 13 STEP 4 ::
 FOR C=1 TO 16 :: TX=Ø !Ø31
98Ø FOR R=L1 TO L1+3 :: TX=T
X*2+B(R,C):: NEXT R :: TT((L
1-1)*4+C)=TX :: NEXT C :: NE
XT L1 !215
99Ø IF S$="N" THEN 1Ø6Ø !112
1ØØØ CALL HD(P$,M$)!248
1Ø1Ø ON ERROR 117Ø !159
1Ø2Ø OPEN #1:P$&".CR" :: PRI
NT #1:CHR$(27);CHR$(65);CHR$
(4)!1ØØ
1Ø3Ø FOR L5=Ø TO 48 STEP 16
:: PRINT #1:CHR$(13);CHR$(1Ø
);"      ";CHR$(27);CHR$(75);
CHR$(16);CHR$(Ø);!Ø46
1Ø4Ø FOR L=L5+1 TO L5+16 ::
PRINT #1:CHR$(TT(L));:: NEXT
 L :: NEXT L5 !Ø21
1Ø5Ø PRINT #1:CHR$(27);CHR$(
5Ø);:: CLOSE #1 !177
1Ø6Ø OPEN #1:P$,VARIABLE 132
 !198
1Ø7Ø PRINT #1:TAB(5);Y$ !224
1Ø8Ø PRINT #1:"      ";:: FOR
 L=1 TO 13 STEP 4 :: PRINT #
1:SEG$(M$,L,4);" ";:: NEXT L
 !235
1Ø9Ø PRINT #1:TAB(35);:: FOR
 L=1 TO 8 :: PRINT #1:TT(L)*
16+TT(L+16);:: NEXT L :: IF
LEN(M$)<17 THEN 116Ø !Ø85
11ØØ PRINT #1: :"      ";:: F
OR L=17 TO 29 STEP 4 :: PRIN
T #1:SEG$(M$,L,4);" ";:: NEX
T L !223
111Ø PRINT #1:TAB(35);:: FOR
 L=9 TO 16 :: PRINT #1:TT(L)
*16+TT(L+16);:: NEXT L !222
112Ø PRINT #1: :"      ";:: F
OR L=33 TO 45 STEP 4 :: PRIN
T #1:SEG$(M$,L,4);" ";:: NEX
T L !219
113Ø PRINT #1:TAB(35);:: FOR
 L=33 TO 4Ø :: PRINT #1:TT(L
)*16+TT(L+16);:: NEXT L !ØØ9
114Ø PRINT #1: :"      ";:: F
OR L=49 TO 61 STEP 4 :: PRIN
T #1:SEG$(M$,L,4);" ";:: NEX
T L !224
115Ø PRINT #1:TAB(35);:: FOR
 L=41 TO 48 :: PRINT #1:TT(L
)*16+TT(L+16);:: NEXT L !Ø16
116Ø PRINT #1 :: CLOSE #1 ::
 CALL CLEAR :: GOTO 21Ø !162
117Ø ON ERROR 118Ø :: CALL S
OUND(9ØØ,-3,Ø):: DISPLAY AT(
19,1):"VERIFY DEVICE NAME:":
P$:"IS PRINTER TURNED ON?" :
: RETURN 92Ø !Ø19
118Ø ON ERROR 117Ø :: RETURN
 1Ø6Ø !154
29ØØØ SUB MG(A$)!2Ø9
29Ø1Ø DIM P$(16)!156
29Ø2Ø DATA ØØØØ,Ø3Ø3,ØCØC,ØF
ØF,3Ø3Ø,3333,3C3C,3F3F,CØCØ,
C3C3,CCCC,CFCF,FØFØ,F3F3,FCF
C,FFFF !144
29Ø3Ø IF G THEN 29Ø5Ø !Ø47
29Ø4Ø RESTORE 29Ø2Ø :: FOR L
=Ø TO 15 :: READ P$(L):: NEX
T L !198
29Ø5Ø G=1 :: X$="" :: FOR M=
1 TO 15 STEP 2 :: X$=X$&P$(A
SC(SEG$(A$,M,1))-48+7*(ASC(S
EG$(A$,M,1))>57)):: NEXT M !
12Ø
29Ø6Ø FOR M=2 TO 16 STEP 2 :
: X$=X$&P$(ASC(SEG$(A$,M,1))
-48+7*(ASC(SEG$(A$,M,1))>57)
):: NEXT M :: A$=X$ :: SUBEN
D !193
29Ø7Ø SUB WAIT :: DISPLAY AT
(24,2):"ONE MOMENT PLEASE" :
: SUBEND !1ØØ
29Ø8Ø SUB HD(P$,X$)!ØØ7
29Ø9Ø ON ERROR 2927Ø !2Ø9
291ØØ DIM A$(16),Z$(4)!Ø4Ø
2911Ø DATA ØØØØ,ØØØ1,ØØ1Ø,ØØ
11,Ø1ØØ,Ø1Ø1,Ø11Ø,Ø111,1ØØØ,
1ØØ1,1Ø1Ø,1Ø11,11ØØ,11Ø1,111
Ø,1111 !24Ø
2912Ø IF F=1 THEN 2914Ø !Ø64
2913Ø RESTORE 2911Ø :: FOR L
=Ø TO 15 :: READ A$(L):: NEX
T L :: F=1 !145
2914Ø OPEN #1:P$&".CR" :: PR
INT #1:CHR$(13);CHR$(27);CHR
$(65);CHR$(7);"      " !Ø1
5
2915Ø M=LEN(X$)/16 !19Ø
2916Ø IF M>1 THEN Z$(4)=SEG$
(X$,49,16):: Z$(3)=SEG$(X$,1
7,16):: Z$(2)=SEG$(X$,33,16)
!2Ø7
2917Ø Z$(1)=SEG$(X$,1,16)!24
5
2918Ø FOR LN=Ø TO 2+2*(M=1)S
TEP 2 !Ø39
2919Ø FOR L=1 TO 15 STEP 2 :
: IF LN=2 THEN T=M ELSE T=MI
N(2,M)!Ø97
292ØØ FOR L2=LN+1 TO T :: FO
R L3=Ø TO 1 !Ø17
2921Ø N=ASC(SEG$(Z$(L2),L+L3
,1))-48 :: IF N>9 THEN N=N-7
 !2Ø1
2922Ø PRINT #1:CHR$(27);CHR$
(75);CHR$(32);CHR$(Ø)!ØØ1
2923Ø FOR L4=1 TO 4 :: IF SE
G$(A$(N),L4,1)="Ø" THEN C=Ø
ELSE C=127 !Ø04
2924Ø PRINT #1:RPT$(CHR$(C),
8):: NEXT L4 :: NEXT L3 :: N
EXT L2 !149
2925Ø PRINT #1:CHR$(1Ø);CHR$
(13);"      " :: NEXT L ::
 NEXT LN !116
2926Ø PRINT #1:CHR$(27);CHR$
(48):: CLOSE #1 !ØØ4
29265 SUBEND !168
2927Ø SUB DUMP3(P$)!184
29275 ! SCREEN DUMP BY ACTUA
L CHARACTER PATTERN JLS 6/89
 !Ø56
2928Ø DIM C$(143)!193
29283 FOR L=132 TO 135 :: C$
```

(See Page 15)

EXTENDED BASIC—

(Continued from Page 14)

```
(L)="" :: NEXT L !151
29285 OPEN #8:P$&".CR",OUTPU
T :: PRINT #8:CHR$(27);CHR$(
65);CHR$(8);!212
29290 FOR R=1 TO 24 :: FOR C
=1 TO 32 :: CALL GCHAR(R,C,T
)!109
29295 IF T<32 THEN T=32 !183
29300 IF C$(T)="" THEN CALL
CHARPAT(T,S$):: CALL CHARPRT
(S$,C$(T))!252
29305 PRINT #8:C$(T);!043
29310 NEXT C :: PRINT #8:CHR
$(10);CHR$(13):: NEXT R :: P
RINT #8:CHR$(10);CHR$(13)::
CLOSE #8 !043
29315 SUBEND !168
29320 SUB CHARPRT(C$,T$)!131
29325 DIM T(16)!124
29330 C$=C$&RPT$("0",16)!110
29335 FOR L=1 TO 16 :: T(L)=
ASC(SEG$(C$,L,1))-48 !088
29340 IF T(L)>9 THEN T(L)=T(
L)-7 !157
29345 NEXT L !226
29350 FOR L=1 TO 8 :: C(L)=0
 :: NEXT L !219
29355 FOR L=1 TO 2 :: FOR L2
=L TO 16 STEP 2 :: FOR P=0 T
O 3 !035
29360 IF (T(L2)AND 2^P)=2^P
THEN C((L-1)*4+4-P)=C((L-1)*
4+4-P)+2^(INT((16-L2)/2))!10
4
29365 NEXT P :: NEXT L2 :: N
EXT L !224
29370 T$=CHR$(27)&CHR$(75)&C
HR$(8)&CHR$(0):: FOR L=1 TO
8 :: T$=T$&CHR$(C(L)):: NEXT
 L !028
29375 SUBEND !168
30820 SUB PAUSE !236
30825 FOR D=1 TO 100 :: NEXT
 D !241
30830 DISPLAY AT(24,2):"PRES
S ANY KEY TO CONTINUE" !088
30835 CALL KEY(0,K,S):: IF S
<1 THEN 30835 !049
30840 SUBEND !168
31600 SUB SUBBER(D$,A$,LN)!1
08
31605 ! SUBBER(FILE NAME,DAT
A,LINE NUMBER OF FIRST DATA
STATEMENT) !007
31610 ! DUMPS STRING DATA RE
SULTS OF MAIN PROGRAM TO A M
ERGE FORMAT DATA FILE :JLS 8
/1984 !152
31615 DEF CR$(S)=CHR$(INT(S/
256))&CHR$(S-INT(S/256)*256)
! CONVERTS LINE NUMBER INTO
CRUNCH FORMAT !034
31620 OPEN #1:D$,DISPLAY ,VA
RIABLE 163,APPEND !191
31630 PRINT #1:CR$(LN)&CHR$(
147)&CHR$(199)&CHR$(LEN(A$))
&A$&CHR$(0)!134
31640 CLOSE #1 :: SUBEND !19
3
```

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TIPS ON USING TI-WRITER

Avoiding problems with the Formatter

By FRANK GEITZLER

Several recent letters to the MICROpendium feedback column have prompted me to develop this little TI-WRITER formatter utility. With it one can cause the four "special" characters (*, &, ^, and @) to print normally. This utility also serves as a mini-tutorial for the TransLiterate command (.TL), the Include File command (.IF), the Define Prompt command (.DP), the COmment (.CO), and the use of "*n*" where "n" is a value from 1 to 99, to prompt for an input value for the formatter.

First write your article, program, or whatever you wish to print, exactly as you wish to print it. If you want to print a asterisk, type a "*." If you want to print an ampersand, type a "&," and so on. It is a good idea to save this file before continuing. In this example, I will call this file "DSK2.UFTXT" (for "unformatted text"). Do not quit the text editor, or purge the file, however.

The next step is to chose four special characters, which you have not used in this file, to be used as substitutes for the four "problem" characters. The way I do this is to select a character I do not think I have used, and use the FIND STRING command to make sure:

FS

/~/

Make sure to position the cursor at the beginning of the text before beginning the search for each of these special characters, and if a special character is found, try again using a different special character. The four I chose in writing this article are characters 37 to replace character 38, character 125 to replace character 42, character 91 to replace character 64, and character 123 to replace character 94. I also used character 92 to cause character 123 to print in the following example.

Having selected your four special characters, use the Replace String (RS) command to substitute them throughout the text. You can use the "All" option here, since you already made sure that they did not exist in the text. Be sure to turn word-wrap off before making this change, though, or strange things could happen to the text. (That's one reason you saved it before you reached this point, isn't it!) For example, to cause the "&" to print correctly:

RS

/}/\/

With all the substitutions made, the next step is to save the file again — I suggest that you use a different name, just so you can get back the un-substituted characters again if you wish. Let's call this file "DSK2.FMTXT" (for "formatted text"). If after printing you decide to make changes, go back to the "UFTXT" file, and repeat the above procedure, so you do not accidentally get yourself into a spot you can't get out of.

You are now ready to print. Load the formatter, but select the transliterate comand file as the file to be printed. I called the file "DSK2.TL," and it contains the following commands:

```
.CO This is a header file used
.CO to enable the printing of
.CO the characters '[', '%', '^',
.CO and '}' without modification
.CO by the text formatter.
.CO prompts 1 through 5 are inserted
.CO to allow several files to be printed
.CO one after another, and to
.CO permit termination without
.CO skipping to a new page.
.DP 1:INPUT FILE 1 (Fctn-4 to stop):
.DP 2:INPUT FILE 2 (Fctn-4 to stop):
.DP 3:INPUT FILE 3 (Fctn-4 to stop):
.DP 4:INPUT FILE 4 (Fctn-4 to stop):
.DP 5:INPUT FILE 5 (Fctn-4 to stop):
.DP 38:ASCII code for 'and'-sign?
.DP 42:ASCII code for '}'?
.DP 64:ASCII code for 'at'-sign?
.DP 94:ASCII code for '^'?
.TL }38}:38
.TL }42}:42
.TL }64}:64
.TL }94}:94
.IF }1}
.IF }2}
.IF }3}
.IF }4}
.IF }5}
```

When the formatter has read the file "DSK2.TL," it will display a series of prompts at the bottom of the screen. The first asks what ASCII character you have chosen and keyed in your formatted text file to replace the ampersand. In my example, I chose ASCII 37, the percent sign, so I would enter "37." The next prompt asks for the value used to replace the asterisk character, and so on. Following the four replacement prompts, you are asked for the name of the first file to print. For our example, this would be "DSK2.FMTXT." The formatter would read and print this file, then stop and prompt for the next filename. Here you can do several things:

1. Press Fctn-4 to stop printing. This avoids the automatic skip to a new page (which sometimes skips several pages). If Fctn-4 is pressed, when you return to the editor the default file name may have been "forgotten."

2. Home the printer to a new page by hand, and then enter a new file name to start a new list.

3. Do not home the paper, but enter a new file name to continue with the next file — this option could be used to continue a large list which had been broken into several parts.

I hope this article has cleared up some of the mysteries of the text formatter. If you have any other questions, I would be pleased to hear from you.

Readers may send correspondence to: Frank Geitzler, 5 Leaman Dr., Dartmouth, Nova Scotia, Canada B3A 2K4.

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CALENDAR

Third-part of program outputs to screen

The following two programs are designed to work with the CALENDAR2 program published in the May edition and the CALENDAR3 program published in June.

The CALENDAR 2 and 3 program output to a printer while the CALENDAR1 program listed here outputs to a monitor. A second program is included that functions as a menu/loader for the three calendar programs.

The author of the calendar programs is Dale A. Kloes.

CALENDAR1

```
10 REM CALENDAR1 - DISPLAY M
ONTH !078
20 REM (C) 1983-1989 BY DALE
 A. KLOES     PUBLIC DOMAIN !
128
30 REM MODIFIED 6/89 FOR MIC
ROPENDIUM !164
40 REM REMOVED MONTHLY THEME
 PICTURES !057
50 CALL CLEAR !209
60 CALL SCREEN(4)!149
70 DEF INVERT(A)=A-INT(A)!07
7
80 DIM DOTW$(5,6)!009
90 CALL COLOR(12,2,2)!223
100 MONMSG1$="  1 - JAN  2 -
 FEB  3 - MAR " !010
110 MONMSG2$="  4 - APR  5 -
 MAY  6 - JUN " !069
120 MONMSG3$="  7 - JUL  8 -
 AUG  9 - SEP " !072
130 MONMSG4$=" 10 - OCT 11 -
 NOV 12 - DEC " !092
140 MONMSG5$=" ENTER THE MON
TH NUMBER " !021
150 YRMSG1$=" ENTER THE YEAR
 " !140
160 YRMSG2$="YEAR MUST BE 15
83 THRU 9999" !033
170 MONMSG6$="INVALID MONTH!
 TRY AGAIN!" !087
180 DISPLAY AT(1,1):"
DISPLAY MONTH" !210
190 DISPLAY AT(2,1):"(C) 198
3-88 BY DALE A. KLOES" !131
200 DISPLAY AT(3,1):"
PUBLIC DOMAIN" !175
210 DISPLAY AT(6,1):YRMSG1$
:: ACCEPT AT(6,23)VALIDATE("
1234567890")BEEP SIZE(4):YR$
 !187
220 IF VAL(YR$)>=1583 AND VA
L(YR$)<=9999 THEN DISPLAY AT
(24,1):" " :: GOTO 240 !157
230 DISPLAY AT(24,1):YRMSG2$
 :: GOTO 210 !028
240 DISPLAY AT(8,1):MONMSG1$
 !136
250 DISPLAY AT(10,1):MONMSG2
$ !179
260 DISPLAY AT(12,1):MONMSG3
$ !182
270 DISPLAY AT(14,1):MONMSG4
$ !185
280 DISPLAY AT(16,1):MONMSG5
$ :: ACCEPT AT(16,25)VALIDAT
E(DIGIT)BEEP SIZE(2):MN !057
290 DISPLAY AT(24,1):" " ::
CN=VAL(SEG$(YR$,1,2))!000
300 YR=VAL(SEG$(YR$,3,2))!03
3
310 ON ERROR 330 !084
320 ON MN GOTO 340,400,500,5
50,600,650,700,750,800,850,9
00,950 !040
330 DISPLAY AT(24,1):MONMSG6
$ :: ON ERROR STOP :: GOTO 2
80 !000
340 MN=11 !133
350 YR=YR-1 !208
360 MN$="JANUARY" !101
370 MX=31 !145
380 HF=4 !073
390 GOTO 990 !048
400 MN=12 !134
410 IF INVERT(YR/4)<>0 THEN
450 !233
420 MX=29 !152
430 IF YR<>0 THEN 460 !237
440 IF INVERT(CN/4)=0 THEN 4
60 !024
450 MX=28 !151
460 YR=YR-1 !208
470 MN$="FEBRUARY" !172
480 HF=4 !073
490 GOTO 990 !048
500 MN=1 !083
510 MN$="MARCH" !180
520 MX=31 !145
530 HF=3 !072
540 GOTO 990 !048
550 MN=2 !084
560 MN$="APRIL" !193
570 MX=30 !144
580 HF=3 !072
590 GOTO 990 !048
600 MN=3 !085
610 MN$="MAY" !046
620 MX=31 !145
630 HF=2 !071
640 GOTO 990 !048
650 MN=4 !086
660 MN$="JUNE" !122
670 MX=30 !144
680 HF=2 !071
690 GOTO 990 !048
700 MN=5 !087
710 MN$="JULY" !140
720 MX=31 !145
730 HF=2 !071
740 GOTO 990 !048
750 MN=6 !088
760 MN$="AUGUST" !035
770 MX=31 !145
780 HF=3 !072
790 GOTO 990 !048
800 MN=7 !089
810 MN$="SEPTEMBER" !244
820 MX=30 !144
830 HF=5 !074
840 GOTO 990 !048
850 MN=8 !090
860 MN$="OCTOBER" !089
870 MX=31 !145
880 HF=4 !073
890 GOTO 990 !048
900 MN=9 !091
910 MN$="NOVEMBER" !170
920 MX=30 !144
930 HF=4 !073
940 GOTO 990 !048
950 MN=10 !132
960 MN$="DECEMBER" !131
970 MX=31 !145
980 HF=4 !073
990 REM!154
1000 DY=1 !085
1010 GOSUB 1470 !019
1020 FOR K=0 TO 5 !061
1030 FOR I=D TO 6 !135
1040 IF DY=0 THEN 1100 !161
1050 IF DY>MX THEN 1090 !069
1060 DOTW$(K,I)=STR$(DY)!185
```

(See Page 20)

TI FAIRE WEEKEND

****

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CALENDAR1—

(Continued from Page 18)

```
1070 DY=DY+1 !179
1080 GOTO 1100 !159
1090 DY=0 !084
1100 NEXT I !223
1110 D=0 !251
1120 NEXT K !225
1130 CALL CLEAR !209
1140 PRINT TAB(2);YR$;TAB(16
-(HF+1));MN$;TAB(25);YR$:!06
6
1150 PRINT TAB(2);"SUN~MON~T
UE~WED~THUR~FRI~SAT" !069
1160 FOR K=0 TO 5 !061
1170 PRINT TAB(2);DOTW$(K,0)
;TAB(6);DOTW$(K,1);TAB(10);D
OTW$(K,2);TAB(14);DOTW$(K,3)
;!082
1180 PRINT TAB(18);DOTW$(K,4
);TAB(23);DOTW$(K,5);TAB(27)
;DOTW$(K,6)!081
1190 NEXT K !225
1200 PRINT : : :!187
1210 CALL HCHAR(13,2,126,30)
!016
1220 CALL HCHAR(22,2,126,30)
!016
1230 CALL VCHAR(14,6,126,8)!
247
1240 CALL VCHAR(14,10,126,8)
!035
1250 CALL VCHAR(14,14,126,8)
!039
1260 CALL VCHAR(14,18,126,8)
!043
1270 CALL VCHAR(14,23,126,8)
!039
1280 CALL VCHAR(14,27,126,8)
!043
1290 CALL VCHAR(14,2,126,8)!
243
1300 CALL VCHAR(14,31,126,8)
!038
1310 PRINT !156
1320 PRINT "PRESS 1 - SHOW M
ONTH" :: PRINT !199
1330 PRINT "      2 - PRINT
MONTH" :: PRINT !040
1340 PRINT "      3 - PRINT
YEAR" :: PRINT !211
1350 PRINT "      4 - EXIT P
ROGRAM" :: PRINT !106
1360 CALL SOUND(200,1397,5)!
193
1370 CALL KEY(0,K19,S19)!143
1380 IF S19=0 THEN 1370 !208
1390 IF K19<49 OR K19>52 THE
N 1360 !093
1400 CALL CLEAR !209
1410 ON K19-48 GOTO 1440,142
0,1430,1460 !149
1420 RUN "DSK1.CALENDAR2" !0
43
1430 RUN "DSK1.CALENDAR3" !0
44
1440 FOR K=0 TO 5 :: FOR I=0
 TO 6 :: DOTW$(K,I)=" " :: N
EXT I :: NEXT K !253
1450 GOTO 180 !003
1460 STOP :: CALL CLEAR :: G
OTO 1460 !117
1470 REM SUBR TO DETERMINE T
HE DAY OF THE WEEK !151
1480 D=1+INT(2.6*MN-.2)+INT(
YR/4+YR)+(INT(CN/4)-2*CN)!07
0
1490 IF D>=0 THEN 1520 !173
1500 D=D+7 !007
1510 GOTO 1490 !038
1520 D=INT(7*INVERT(D/7)+.5)
!060
1530 IF YR+1<>0 THEN 1580 !0
13
1540 IF INVERT(CN/4)=0 THEN
1580 !125
1550 IF MN$="JANUARY" THEN 1
570 !138
1560 IF MN$<>"FEBRUARY" THEN
 1580 !156
1570 D=D+1 !001
1580 RETURN !136
1590 END !139
```


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Use form on Page 48. Visa/MC welcome

CALENDARMENU

```
10 REM CALENDAR !244
20 REM (C) 1983-1988 BY DALE
 A. KLOES   PUBLIC DOMAIN !0
95
25 CALL CLEAR :: CALL SCREEN
(8)!236
30 DISPLAY AT(1,1):"     CAL
ENDAR PROGRAMS" !157
40 DISPLAY AT(2,1):"(C) 1983
-88 BY DALE A. KLOES" !131
50 DISPLAY AT(3,1):"       P
UBLIC DOMAIN" !175
60 DISPLAY AT(6,1):"PRESS 1
- SHOW MONTH" !109
70 DISPLAY AT(8,1):"      2
- PRINT MONTH" !208
80 DISPLAY AT(10,1):"      3
 - PRINT YEAR" !165
90 DISPLAY AT(12,1):"      4
 - EXIT PROGRAM" !062
100 CALL SOUND(200,1397,5)!1
93
110 CALL KEY(0,K,S)!187
120 IF S=0 THEN 110 !117
130 IF K<49 OR K>52 THEN 100
 !152
140 CALL CLEAR !209
150 ON K-48 GOTO 160,170,180
,190 !093
160 RUN "DSK1.CALENDAR1" !04
2
170 RUN "DSK1.CALENDAR2" !04
3
180 RUN "DSK1.CALENDAR3" !04
4
190 STOP :: CALL CLEAR :: GO
TO 190 !122
200 END !139
```

TRIALS OFA c99 BEGINNER

Two more math functions

By CHARLES E. KIRKWOOD JR.

Have you ever had an idea which you thought was a good one, then discover that the idea was not so practical after all?

Well, I did!

Since Tom Bentley's floating-point library is required for the floating-point Mathematical functions, I thought that time could be saved by appending the Mathematical functions to the floating-point library, compiling and assembling this combined library to link with a program.

This worked fine for my sample program. But, then I wrote a program using two-dimensional floating-point arrays. You can probably guess what happened if you remember that floating-point numbers take up four times the memory of integers.

Back to the drawing board!

Actually all of the Mathematical functions are not really needed with every program. So I ended up modifying the functions and separating them into different D/V80 files. First, the function **init()** was eliminated and any required constants were initialized with each function. When a function uses one or more other functions, the additional function(s) are included.

For example, the function **ax()** requires **exp()** and **ln()**, so all three are included under a file name **AX**. The functions **exp()**and **ln()** are also stored as separate files, **EXP** and **LN**, respectively. In the modifications, I also shortened some of the variable names. You might find this idea advantageous, also.

I will be glad to send you these up-to-date files if you will send me a formatted disk with a self-addressed mailing label and return postage. My address is Box 1241, Clemson, SC 29633.

Included this month are two additional functions: square root and absolute value of a floating-point number. Newton's method for square root was discussed in the August 1988 issue. The function **root()** is an extension of the square root and, of course, can also be used for square root as well as other roots.

```
/*SQUARE ROOT OF A FLOATING-POINT NUMBER a*/
sqrt(a,r)
float *a,*r;
{
  float ro[8],rd[8],ra[8],o[8];
  float z[8],er[8],mo[8],t[8];
  stof(".000001",er);
  itof(0,z);
  itof(1,o);
  itof(2,t);
  itof(-1,mo);
  fcpy(o,rd);
  fcpy(o,ro);
  fcpy(o,r);
  if(fcom(a,"==",o))
    return(r);          /*if(a=1) r=1*/
  else if(fcom(a,"<=",z))
  {
    if(fcom(a,"<",z))
    {
      puts("The root cannot ");
      puts("be calculated!\n");
    }
    fcpy(z,r);
    return(r);          /*if(a<=0) r=0*/
  }
  while(fcom(rd,">",er)) /*while(rd>er)*/
  {
    fexp(a,"/",ro,r);
    fexp(r,"+",ro,r);
    fexp(r,"/",t,r);    /*r=(ro+a/ro)/2*/
    fexp(r,"-",ro,rd);
    fexp(rd,"/",r,rd);
    if(fcom(rd,"<",z))
      fexp(rd,"*",mo,rd);/*rd=abs((r-ro)/r)*/
    fcpy(r,ro);         /*ro=r*/
  }
  return(r);
}

/*ABSOLUTE VALUE OF A FLOATING-POINT NUMBER a*/
abs(x,r)
float *x,*r;
{
  float z[8],mo[8];
  itof(0,z);
  itof(-1,mo);
  if(fcom(x,"<",z))
    fexp(x,"*",mo,r);
  else
    fcpy(x,r);
  return(r);
}
```

Also included this month is a general purpose program that can be used with the **graph()** function to plot as many as 10 curves other than polynomials. The program uses integer variables and is not changed when you want to change the curve(s). The curve(s) to be plotted is(are) defined or solved in a function called **eq()**. The variables may be floating-point or integers, depending upon the equation(s). Any conversions are in this function. To change the equation(s), just change this function only.

The curves produced by the function **graph()** included with the polynomial curves program will be distorted when printed. The horizontal and vertical spacings are not the same. To make the x and y units on the Epson printer about the same the following changes are made in the function (refer to Clint Pulley's program PRSET supplied with the c99 package):

```
Change graph(n,m,dx,dy,x,yy,s,p,pr)
To     graph(n,m,dx,dy,x,yy,s,p)
Change int m,n,dx,dy,p,pr;
```

(See Page 26)

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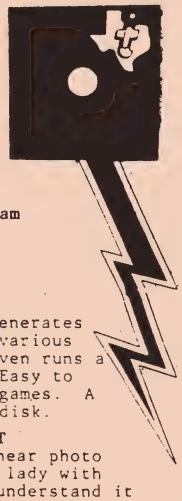

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#2. WHEEL OF FORTUNE, BLACKJACK & JOKER POKER
Three fantastic freeware programs on one disk. Professional quality and the best "wheel" game around at any price. Vanna would love it !

#3. DUMPIT
This disk helps you transfer many TI modules to disk. Recommended for users with some programming ability. Ed/Assembler and "widget" recommended.

#4. PRINTART
Two disk sides filled with files that print out great quality pictures on most printers. Many famous TV and comic characters on this disk. "Beam me up Scotty."

#5 ORIGINAL TI SALES DEMO DISK WITH TI-TREK GAME
This disk is packed full of assorted files of all types. Graphics, speech etc. Contains complete TI-TREK game for Speech Editor or TE-II module.

#5A. TI MUSIC/GRAPHICS
A great collection of music and matching graphics. Great examples of music & sprite programming.

#6. EXBASIC MUSIC
A two disk side collection of music & graphics that we consider some of the best.

#7. SPACE SHUTTLE MUSIC/GRAPHICS
One of the real outstanding examples of programming. This disk has it all. Great graphics, music, and continuity. A real salute to the space program. It is almost like watching a movie!

#8. LOTTO PICKER
This program randomly generates numbers for use in the various state lotto games and even runs a simulated lotto game. Easy to modify for pick 6 etc. games. A great learning and fun disk.

#9. MONA LISA PRINT OUT
This disk prints out a near photo quality picture of that lady with the clsssic smile. We understand it was made by digitizing the original with a super powerful computer and converting the output to run on the TI-99/4A. Impresses everyone who sees it! Requires Epson printer compatibility.

#10. GOTHIC PRINT
This disk lets you type out a phrase on the screen and then print it out in gothic (Old English) style. Looks like hand-lettered calligraphy. Use for invitations, announcements and business cards.

#11. ANIMATED CHRISTMAS CARD "WOODSTOCK"
This disk was actually originally sent to TEX-COMP as a greeting from master programmer Ray Kazmer. It was just too good not to share! One of the best examples of computer animation and graphics you will see on any computer!

#12. TI-99 OLOPY
This great piece of programming actually simulates and plays the famous board game. For legal reasons we cannot name the game but "do not pass Go! but go directly to Jail!"

#13. STRIP POKER (PG RATED)
Play Poker against your TI-99/4A. When you win a hand she loses--a piece of her clothes that is. Don't worry about being a lousy poker player. Another file is included where you don't even have to know an ace from a king.

#14. FIGURE STUDY (PG RATED)
A collection of Playboy type centerfolds that can be printed out at your command. Use with any printer.

#15. STAR/EPSON PRINTER DEMO
This 2 sided disk contains a large collection of demo programs to put your Star/Epson compatible printer through its paces. Learn what control codes can do! Lots of text and graphics examples. Second side has a great tutorial on printer graphics with examples!

#16. SIDEWAYS PRINTOUT
This program allows you to print out the material from your printer sideways. Great for spreadsheets, banners and large graphics. Second side contains some new enhancements for Multiplan not available on the TI upgrade.

#17. TI FORTH DEMO
This demo disk was released by TI to show the power of Forth. Fantastic music and graphics. Ed/Assem and 32K required!

#18. TI DIAGNOSTIC
This program loads into the Mini-Memory module and checks out your entire system. Much better than disk based diagnostics that cannot be used if a problem in the disk system is at fault. Complete documentation on second side.

#19. TI WRITER/MULTIPLAN UPGRADE
This disk released by TI adds real lower case to your TI Writer, speed to Multiplan and other enhancements. Easy to use., just substitute new files for old! Instructions included.

#20. ACCOUNTS RECEIVABLE
This self contained prize winning program loads and runs in Exbasic and has all the features found in a progessional accounting system. Complete with documentation and a second disk side with report generating programs.

#21. DATA BASE DEMO DISK
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#23. WILL WRITER
Enter your answers to a group of computer asked questions and this program then writes you a last will and testament. Now you can leave your TI-99/4A to your favorite nephew. Works with any printer. Appears legal in all states but better check that out!

#24. ENGINEERING CALCULATIONS
A two sided computer handbood of dozens of the most often used engineering and technical formulas. A real time saver. Does conversions, calculations and even designs electrical circuits. A must for anyone whose profession or hobby involves scientific calculations. Even has medical and communications applications.

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This disk contains many menu accessible files covering most everyday medical emergencies. A good "what to do until the doctor or paramedic comes" guide. Well written and organized. Could very easily save a life!

#26. R RATED GAME
It was bound to happen. A talented (but demented) programmmer in Germany wrote an Invaders type game but with most unusual guns and targets. Definitely not what you would find at your neighborhood arcade. Not only a great party game but some great programming. You must be over 18 to order this one!!

#27. KIDS LEARNING
An educator in Georgia put this two sided disk collection of educational programs together. Contains great material. Math, geography, reading improvement, and even IQ testing. All high quality programs for kids of all ages.

#28. LOADERS AND CATALOGERS
We put together a collection of the best programs that catalog and load a group of programs on a disk. Just try them, pick the one you like and transfer it to another disk with the file name LOAD and you are in business.

#29. LABEL MAKER I
Two great programs for making custom labels for disks, addresses video tapes or any other application. Even contains a graphic display of the TI-99/4A console. Now you can create custom labels of any number by just typing in the lines as you want them. Uses standard tractor labels.

#30. HOUSEHOLD BUDGET PRINTOUT
With this disk you print out the data you have stored with the TI HBM Module. HBM is a great module that can be used for many home and small business applications but TI forgot to include a printout function. This program comes with full instructions and we are sure that your HBM Module will now start being used. Fantastic programming job.

#31. MORSE CODE TRAINER DISK
This disk has everything you need to learn and practice Morse Code for the various FCC license exams. It also is great for scout groups and school "ham" clubs for group training and merit badge qualification. Professional quality.

#32. EXBASIC XMAS MUSIC
Two disk sides full of high quality xmas music that can be played throughout the holiday season and then used as a learning tool since it contains wonderful arrangements and graphics. Autoloading and menu driven.

#33. CHECKERS & BACKGAMMON
A collection of great checkers and backgammon games for the TI-99/4A. These are professional in quality and will keep you busy for hours.

#34. SOLITAIRE & SCRABBLE
Another collection of classic games for the TI-99/4A. Exbasic & 32K req.

#35. PROGRAMMING AIDS & UTILITIES I
A collection of some unusual programs of interest to programmers. One program shows a group of opening title displays, another is a cross reference program as good as any of the commercial ones, plus a great disk management utility.

#36. STRICTLY BUSINESS
A collection of various programs for evaluating loans, calculating interest, and other financial items such as return on investment and security performance. Two disk sides filled with financial and business related programs.

#37. LAPD COOKBOOK
This unofficial police cookbook was put together by one of our boys in blue who is also a gourmet chef. (Yes, it contains jailhouse chili) Over 50 great receipes from soup to nuts on two disk sides and each separate side can be called up on screen or printer in exbasic from a menu. As good as any of the new PC computer cookbooks we have seen.

#38. GREAT 99/4A GAMES VOL. I
A collection of professional games in assembly and exbasic that all load from a menu in exbasic. Includes a great ski game where you dodge the trees in a fast downhill run. We have included only the best.

#39. GREAT 99/4A GAMES VOL. II
Still more of the great ones from all over the world. The quality, graphics and speed of many of these games will make you wonder why they were never released commercially.

#40. ARTIFICIAL INTELLIGENCE
This disk contains the famouse computer program "Eliza" where you type in a question or a problem you are having and "Eliza" helps you find the solution. Also contains one of the better bio-rhythm programs so you can analyze all your emotional problems at one sitting.

#41. VIDEO GRAPHS MODULE BACKUP DISK
This disk is a backup of the discontinued Video Graphs Module from TI. For legal reasons, it can only be purchased for backup use by owners of the original module. Do not order UNLESS you have the original module and intend to use this disk only for backup purposes. Exbasic autoload...

#42. FUNNELWEB FARM UTILITY
You heard about this one, now direct from Australia is the latest version of this fantastic utility that puts everything at your command. From one program you can access word processing, editor assembler, telecommunications and just about everything else. A freeware program complete with documentation on a second disk side.

#43. BEST OF BRITAIN, VOL I
Now for the first time, a collection of the best 99/4A games Britain has to offer including the famous "Billy Ball" series of arcade games. Great graphics, action and excitement.

#44. LABEL MAKER I GRAPHICS
A disk filled with graphics for the Label Maker I disk (#29). Dozens of great graphics for custom labels!

#45. BEST OF BRITAIN, VOL II
This disk contains an outstanding 3-D graphics adventure game for the TI-99/4A. Carfax Abbey lets you actually move through a four story mansion complete with bats and vampires. You actually are placed in each room and go up and down stairs and through secret panels. Legend of Zelda...look out!

#46. SUPER TRIVIA 99
A great trivia game for 1 to 4 players with great questions and capability to add your own and print out the files. This one is a real challenge.

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Move through the chambers of a Pyramid in search of hidden treasure. Fantastic graphics and great entertainment.

#51. BERLIN WALL (from Canada)
This game requires a mine field to be crossed before escaping from E. Berlin. Good graphics and a real challenge.

#52. ANIMATION 99 (from Germany)
THIS IS THE ONE!!! A demo disk filled with computer animation routines like you have never seen before on any computer. See famous cartoon figures move with more realism that on Sat. morning TV. This disk received a standing ovation when previewed at a local users group. We have even included instructions how to do it yourself on the second disk side. This one is a show stopper!!!

#53. HACKER/CRACKER
A collection of disk copying programs that copy TI disks by tracks. If one of these can't copy a protected disk nothing will. We included a collection of the very best ones including both TI and CorComp compatible. These programs require 2 disk drives and 32K of memory.

#54. ASTRONOMY
This program from Australia plots the heavens and teaches you about the solar system. A great learning and reference tool. Exbasic and 32K required. Don't confuse this one with our Astrology demo. They are not the same...ask Nancy!

#55. SCREEN DUMP
This program allows you to dump disk and even module programs to a Star Epson compatible printer. Comes with easy to follow plans to build a load interrupt switch which is needed to dump module programs. This dump program by Danny Michael is considered the best of the bunch! Complete with documentation.

#56. SPREAD SHEET
OK, it's not Multiplan but it works great and handles many spread sheet applications. A great way to learn to use spread sheet software. Comes with full instructions and documentation.

#57. TELCO
Considered one of the best data communications programs for the TI-99/4A. Complete with documentation.

#58. PR BASE
The alltime most popular and widely used data base program for the TI-99/4A. A freeware program that is widely supported and updated.

#59. GRAPH MAKER
A collection of the best programs for producing graphs and charts from your data. Exbasic and printer.

#60. FREDDY
A fantastic game where you guide the hero through underground passages filled with danger. Nintendo quality, great graphics and fast action. One of the best we have ever seen!!!

#61. THE MINE
A fast action game from F.R.G. that will keep you going for hours. Many screens and skills required.

#62. DISK MANAGER II MODULE BACKUP
The complete TI Disk Manager II on Disk. For legal reasons it is only available to owners of the original module for backup use.

#63. ASTROBLITZ/MAZOG
A pair of great games that continue where Parsec and Munchman leave off. Imagine Parsec with enemy space craft coming from in front and in back of your ship!!!

#64. MAJOR TOM/SPACE STATION PHETA
A pair of great space games. These two are going to keep you in front of the 99/4A for hours. Great!

#65. PERFECT PUSH
An all new space game where you assemble and launch a rocket ship in outer space while avoiding a space monster. This one is professional in very way..graphics, speed and action!!!

#66. HEBREW TYPEWRITER
This program converts your TI-99/4A keyboard into a typewriter that displays Hebrew letters on the screen. Can also be printed when used in conjunction with screen dump program (included). Great for religious training or making your copy of the dead sea scrolls or ten commandments!

#67. GENEALOGY
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#68. CHESS
The original computer chess game Sargon has been reprogrammed for the TI-99/4A. Now play chess with your computer. Documentation included. Exbasic autoload.

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A very useful utility for printing TI Writer and 99 Writer II files in separate spaced columns. Saves hours in producing a newsletter. Complete with documentation.

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#88. AUSSIE GAMES VOL 1
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#89. PROCALC
This is an on screen calculator for decimal/hexidecimal conversions and much more. A must for the serious programmer.

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This checkbook manager is considered the ultimate with every feature you can think of for keeping track of your checking account and keeping records of your spending for budget and tax purposes. Complete with documentation.

#91. "THE MAZE OF GROG"(St. Valentine)
Ray Kazmer has created a great maze game with fantastic graphics and the characters from his now legendary "Woodstock" disk. Fun for all!!!

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Written by 99/4 programming great Charles Ehninger, this prize winner originally sold for $59.95. Keeps track of household, business or personal items by category and provides automatic updating for inflation etc. A must for tax and insurance records!

#93. THE 1989 KBGB GIRLIE CALENDAR
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c99—

(Continued from Page 21)

```
To     int m,n,dx,dy,p;
Change int nn,nt,i,j,ymin,ymax;
To     int nn,nt,i,j,ymin,ymax,pr;
Add after the statement nt=0;:
       if(p==2)
       {
         pr=fopen("PIO.LF","w");
         fputs("\033l",pr);
         fclose(pr);
         pr=fopen("PIO","w");
         putc(12,pr);
       }
       putchar(12);
Add just before return;:
       if(p==2)
       {
         close(pr);
         pr=fopen("PIO.LF","w");
         fputs("\033@@",pr);
         fclose(pr);
       }
```

The printer file is opened in the function as PIO.LF. The code **0331** tells the printer to set the line spacing to 7/72 of an inch, which is close to 1/10. This file is then closed and reopened as PIO to print the graph. At the end of the graph() function **033@** will reset the printer.

To use this revised function with the polynomial evaluation program the following changes must be made in the program:

```
Change the last four statements from
       putchar(12);
       graph(nc,np,dx,dy,x,y,c,p,pr);
       if(p==2)
         fclose(pr);
To     if(p==2)
         fclose(pr);
       graph(nc,np,dx,dy,x,y,c,p);
```

Now to get back to the new program. The example chosen to show the use of the program with the function graph() is a cycloid. The cycloid is treated as two curves since a square root has a plus and minus value. The positive values are stored in y<1><k> and the negative values in y<2><k>, where k starts at 1 and continues until all points have been stored. The cycloid equation is:

$$x^{2/3}+y^{2/3}=a^{2/3}$$

The constant **a** was chosen as **20**, the 2/3 power was calculated to be 7.3688553 and this number was used in the cycloid function so that it would not have to be recalculated every time. Note that the cycloid function is included as a D/V80 file. Solving the equation for y gives:

$$y=(20-x^{2/3})^{3/2}$$

My input data was the * for the character for printing each part of the curve, xo=-20, xm=20, dx=2 and dy=2 for the screen, dx=1 and dy=1 for the printer. For curves of this type stay within the x bounds which, in this example, is between -20 and 20, inclusive. The value dy=0 is used when you are not sure how much space will be taken up by the graph. A dy value will be calculated so that the entire figure will be on the screen or page.

```
/*PROGRAM TO PLOT MATHEMATICAL EQUATIONS*/
#include DSK1.STDIO
#include DSK1.FLOATI
extern atoi(),printf(),fprintf();
main()
{
  int x[75],y[11][75],xo,xm,dx;
  char s[15],c[11];
  int dy,nc,np,i,j,k,p,pr,z;
  /* nc = number of curves */
  /* np = number of points */
  /* c  = character symbols for curves */
  /* xo = initial x value */
  /* xm = final x value */
  /* dx = x step or increment */
  /* dy = y step or increment */
  puts("Input 1 for screen output or \n");
  puts("      2 for printer output      ");
  p=atoi(gets(s));
  if(p==2)
```

(See Page 27)

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c99—

(Continued from Page 26)

```
  pr=fopen("PIO","w");
puts("\nInput number of curves ");
nc=atoi(gets(s));
puts("\nInput character symbols for each curve");
for(i=1;i<=nc;++i)
{
  printf("\nCurve #%d ",i);
  c[i]=getchar();
}
puts("\nInput initial value of x ");
xo=atoi(gets(s));
puts("\nInput last value of x    ");
xm=atoi(gets(s));
puts("\nInput x increment        ");
dx=atoi(gets(s));
puts("\nInput y increment        ");
dy=atoi(gets(s));
k=1;
putchar(12);
while(xo<=xm)
{
  eq(k,xo,y);
  x[k]=xo;
  if(p==2)
  {
    fprintf(pr,"%4d ",xo);
    for(j=1;j<=nc;++j)
      fprintf(pr,"%4d ",y[j][k]);
    putc(10,pr);
  }
  else
  {
    printf("%4d ",xo);
    for(j=1;j<=nc;++j)
      printf("%4d ",y[j][k]);
    putchar(10);
  }
    xo=xo+dx;
    ++k;
  }
  np=k-1;
  if(p==2)
    fclose(pr);
  else
  {
    puts("Press any character ");
    z=getchar();
  }
  graph(nc,np,dx,dy,x,y,c,p);
}
#include DSK1.ROOT
#include DSK1.GRAPH
#include "DSK1.CYCLOID"

/*CYCLOID*/
eq(k,x,y)
int k,x,y[][75];
{
  float yf[8],a[8],hf[8],y3[8];
  float y1[8],y2[8],a1[8],y4[8];
  int xx;
  xx=x*x;
  itof(xx,y1);
  root(3,y1,y2);
  stof("7.3688553",a);
  fexp(a,"-",y2,y3);
  fexp(y3,"*",y3,y4);
  fexp(y4,"*",y3,y4);
  root(2,y4,yf);
  y[1][k]=ftoi(yf);
  y[2][k]=-y[1][k];
  return;
}
```

Load the following object files with your program: CSUP, CFIO, PRINTF, FPRINTF, and FLOAT.

Comprodine offers poster program

Comprodine has recently released Giant Artist Posters, for use with TI-Artist.

Giant Artist Posters (G.A.P.) by Paul Coleman, author of Designer Labels, creates posters using TI-Artist screens, according to the manufacturer. Full-screen TI-Artist pictures saved as ''instances'' are loaded, then printed out in nine sizes ranging from 10'' x 14'' to larger than 5' x 7'. Pictures can be printeted in two formats on any Epson-compatible printer, the manufacturer says.

The program is written in c99.

Program features include a size chart (to provide information regarding the number of screens, number of sheets, size of finished poster, lines per page and approximate printing time), a printing test and a background layout grid to load into TI-Artist.

G.A.P. requires 32K, disk, Extended BASIC, TI-Artist version 2.0 and an Epson compatible printer. The program is TI/99 and Geneve 9640 compatible, the manufacturer says. It sells for $15 plus $1.50 shipping and handling.

For further information, or to order, contact Comprodine, 1949 Evergreen Ave., Fullerton, CA 92635.

Law enforcement info on GEnie

The GEnie service has added A.L.E.R.T. (A Law Enforcement RoundTable) to its menu of online services. It is designed for persons in law enforcement and related occupations.

For GEnie signup information, call 1-800-638-9636.

THE MAKING OF A PORTABLE TI

Myarc disk controller is key to making system work

By JAN JANOWSKI

This is the third and final installment describing Jan Janowski's portable TI project. Previous installments appeared in the June and July editions.—Ed

It is now December, 1988, and at Don Jones' yearly social, I am being asked over and over by members of the Chicago Users' Group, "How close are you to success?"

I freely admit that I am stuck, but I add that I am very, very close. Then, in a conversation over other things TI, it hits me — *Why don't I look at my Myarc disk controller?* It might be more compact than the TI disk controller, and be easier to implement. (Remember, I was trying to implement a disk controller DSR.)

I looked inside the DSDD card, and discovered that the Myarc card was much more compact. Maybe it could help me.

I removed all socketed ICs except for the PROM, and reinserted the card, without connecting it to the disk drives.

The results were gratifying, in that it still loaded the DSR, and the RAMdisk worked. I couldn't believe my eyes. It was working. All I had to do was make a plug for the I/O port, for operation when the portable was disconnected from the PEB and its disk controller. Hopefully this would give me the fix that Texas Instruments had mentioned to me in its letter.

The Myarc DSDD disk controller card combined a more efficient layout and a more thorough implementation of the PAL on the board. What's a PAL? A PAL is not only a good friend, but a Programmable Array Logic chip that is of as great or greater importance than the PROM (Programmable Read Only Memory) chip.

PALs can be explained using a piece of paper. Draw 6 AND gates, each with 12 inputs. An AND gate is a digital logic circuit in which the output of the chip depends on the status of the signals at its input. A positive AND output will go high (digital 1) if all its inputs are high. An active low AND gate output will go low (digital 0) when all its inputs are low.

Concerning the AND gates you've drawn on paper, imagine that you could connect or disconnect some of the inputs of the AND gates, and tie others together, so that one input line could be connected to multiple AND gates. Furthermore, imagine that the outputs of each AND gate are fed back to the input of each of the 6 AND gate inputs, including itself, and that these outputs can also be programmed to gang multiple lines together. Just think of the possible combinations.

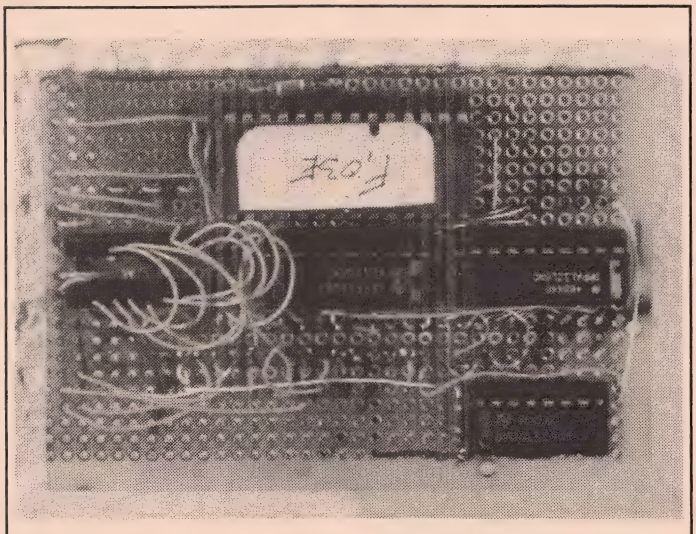

Fig. 1 Close-up of a failure. Disk DSR "dummy plug."

For an equivalent example of what Myarc is doing, look at the schematic of a Horizon RAMdisk. It would be possible to replace chips U19, U3, U18, U20, and U10 with one 20 pin PAL, a 12L6. By the way, the name of the PAL, 12L6, gives an insight as to what function it performs. 12L6 has 6 gates, each with a maximum of 12 active low inputs, and a maximum of 6 outputs. Depending on how the part is programmed (by the designer), he could use any part or all of the device. (In the Horizon RAMdisk example, you would not have the flexibility of the selectable CRU address, but think of the space, component, and power savings that the implementation of this one chip provided. Incidentally, this is why the Myarc RAMdisk cannot be moved from 1000 CRU; this CRU address has already been burned into a PAL that resides on that card.)

Coincidentally, as soon as I had disassembled the disk controller card, I received an answer to my letter from Lou Phillips, of Myarc, on this. Here is his response:

The problem is one of memory utilization. In other words, certain programs assume that VDP RAM and pointers to it are set accordingly. Some software uses that info and performs accordingly. Others assume a certain setting. The setting is performed by the FDC (Floppy Disk Controller card) and when it is powered up. One thing you could do is have the ROM for your RAMdisk place a >37d7 in location >8370 of CPU RAM and >AA, >3F, >FF, >11, >03, in VDP RAM starting at location >37D8. That should do it.

More than two months later, after three revisions of the plug that was to finish this project, I determined that the timing for the data bus on this "dummy plug" is not going to work. About 65 hours of work was put in on this plug and I find that I am at another impasse . . . Darn. (See Fig. 1.)

This project, the making of a portable, sure has had its ups and downs. Just about the time that I feel that everything is going right, I find an obstacle in my path. Fortunately, I have been helped, by the TI community, during my times of need, and I have certainly been in need during this project. Let me now set the stage as to

(See Page 30)

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THE MAKING OF A PORTABLE TI

(Continued from Page 28)

Where I was as of March 1, 1989:

I had succeeded in:

A. making a battery operated black TI-99/4A console;

B. putting a RAM disk inside a console;

C. making an 8 bank "supercart";

D. implementing a parallel port for this portable.

But in doing this, I ran right smack into the TI operating system. From TI's standpoint, what I was trying to do was completely *illegal*. When I use this word, I don't mean that I was breaking any law of any human society. Rather, in attempting to have a disk access without a disk controller card, I was attempting to do something that I would not normally be able to do with my TI computer. *You can't have disk access without a disk controller card*; you need a disk controller provide the necessary DSR, and this is why you lose memory when you add a disk system.

You can try this out for yourself: In Extended BASIC, type in the SIZE command, both with and without a disk system. The disk controller card reconfigures the computer's available memory to a smaller amount, and creates the Device Service Routine in the process.

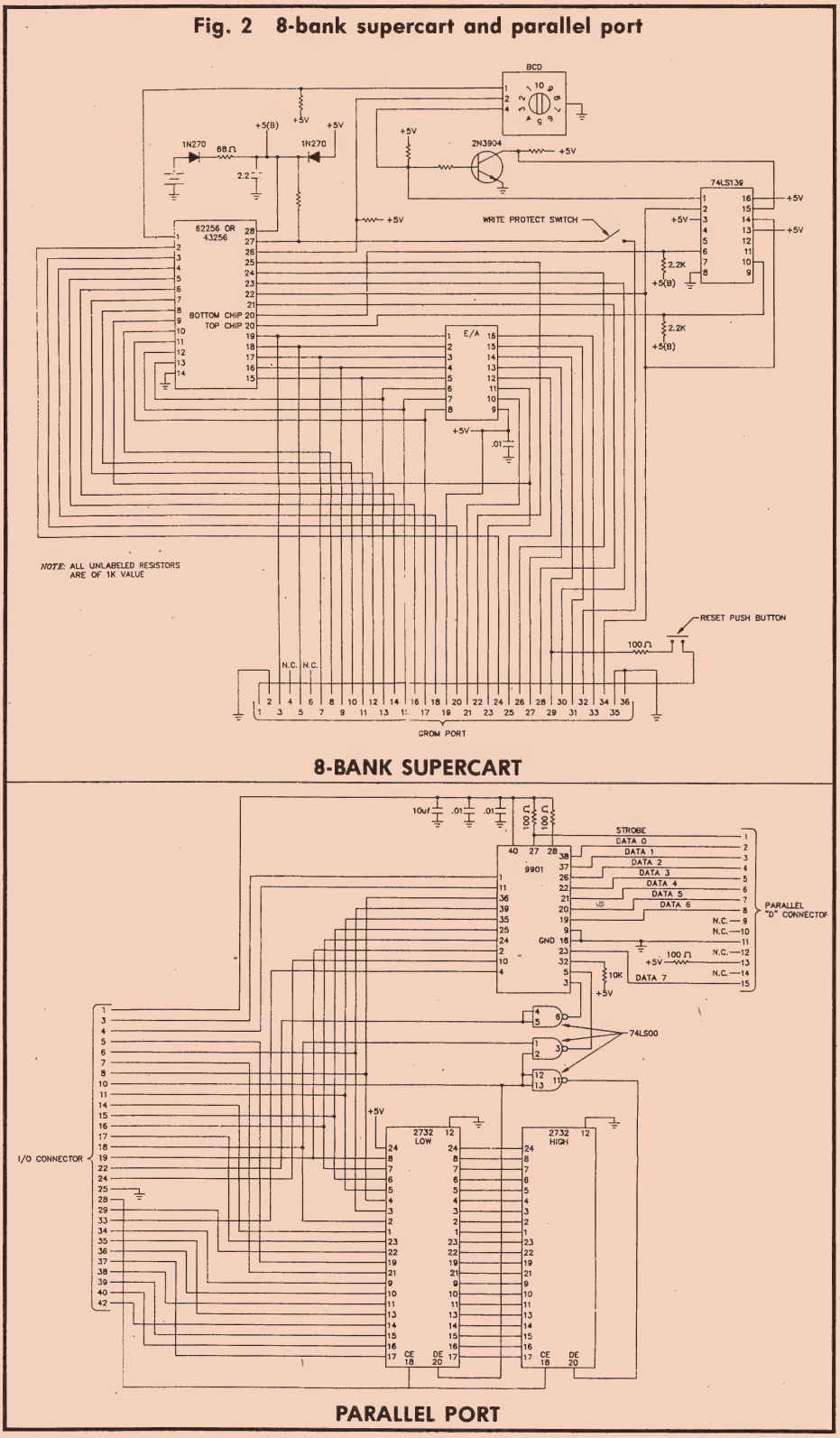
My basic problem with this is that the disk controller is not present in my portable computer. The built-in RAMdisk alters the VDP RAM so that on power up the MENU program is executed, and that is about it. It assumes that the disk controller is there, but it isn't present on my portable, so what I was attempting to do was entirely illegal.

So here I was, so close to success and simultaneously so near to failure. Then somehow, word of my problem got out. I was left a message from Barry Boone on "The Chicago Connection" BBS (312-453-7831). I called Barry and found he had been having problems similar to mine, but for a different reason. He had modified his ROS (RAMdisk Operating System) to fix his problem, and he felt a patch to the 7.3 ROS might work.

Barry is a software fella and I am a hardware fella. I have the greatest respect for the Barry Boone's and Jim Derk's of the TI community. They can look at a problem and re-design the software to work around it. I can do some hardware re-designing, but I am exceptionally weak in the software area. Though I knew what was wrong, and though I knew where the problem lay, I didn't have the foggiest idea of how to fix it with software. This is why I was concentrating on a "dummy plug," to emulate a

(See Page 32)

Fig. 2 8-bank supercart and parallel port



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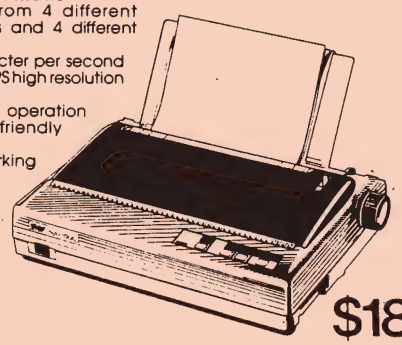

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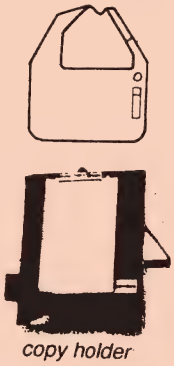

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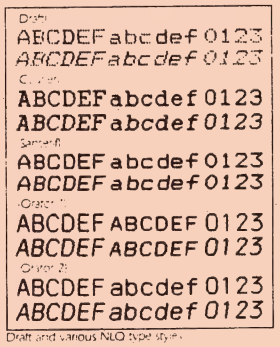

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THE MAKING OF A PORTABLE TI

(Continued from Page 30)

disk controller. (In the long run, I am glad it didn't work, as I would later find another need for that I/O port.)

As a result of our communications, Barry sent me a modified ROS, P-ROS, to be loaded instead of ROS on a RAMdisk, to allow that RAMdisk to function without a disk controller card. Wouldn't you know it, it worked! My portable TI worked as if it had a disk controller inside the console. The RAMdisk operates flawlessly, both as a portable, and when attached to an expansion box.

I later asked Barry if he could explain what he had done, and his explanation is as follows:

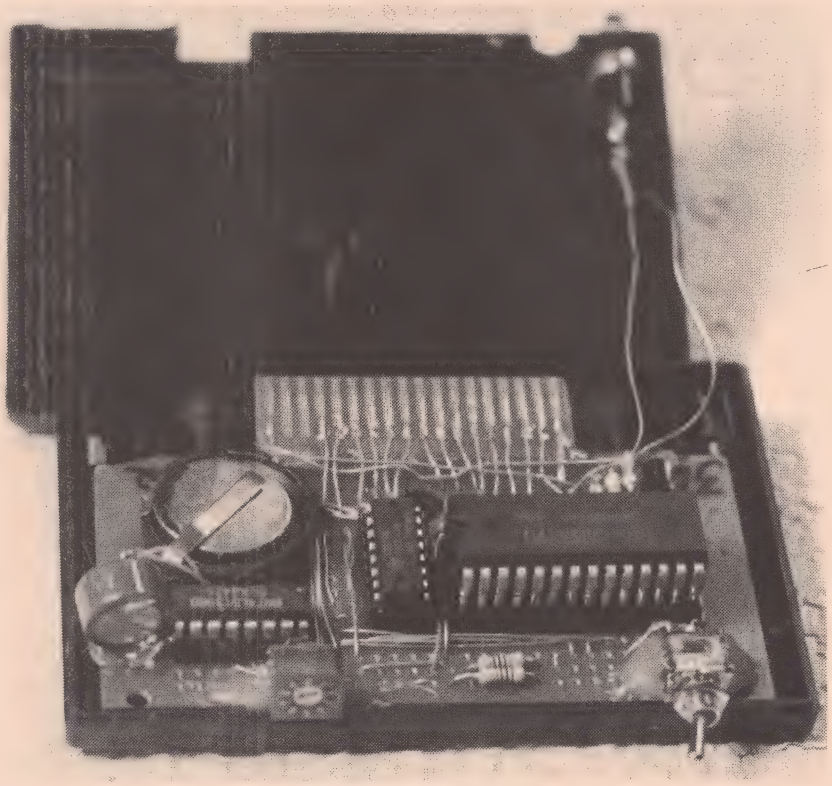
The modifications made to P-ROS were simple sector edits, which accomplished the following: On powerup, set the value at >8370 and initialize the disk buffers. Since this mod was made without source code, the only "drawback" is that the powerup feature must be turned on... (definitely not a problem if you use MENU). The only other incompatibility problem will be with those programs that do a CALL FILES or equivalent to re-partition the disk buffers, since the ROS does not contain those routines.

With this major stumbling block out of the way, I proceeded to install the parallel port inside the console. After the installation, everything seemed to be just fine. However, another critical problem appeared: The parallel port worked fine as a portable, but, when connected to the expansion box and powered-up, the disk controller card and the parallel port were fighting for control of the computer, and neither was winning. The parallel port worked fine in the portable when it alone was connected to the I/O slot, so it was decided that the parallel port would remain a device that would plug into the I/O slot and it would be used as needed. That was a workable solution. Incidentally, the Chicago Users Group's Jim Derk is writing the code for the parallel port. Because of this, we here in Chicagoland will be creating our own custom parallel ports. (See Fig. 2, the 8-bank supercart and parallel port).

With this last change, everything now works just as it was planned, and I believe that this project is a resounding success.

Fig. 3 8-bank supercart

8-BANK SUPERCART WRITE PROTECT SWITCH AND RESET BUTTON



8-BANK SUPERCART

All the programs I have wanted to use are available to me, and they load with lightning speed. So, success has smiled upon me at last.

But now, how can I spread the word? I decided to invest in having the schematic of the portable done on a CAD workstation, to make it as clear and concise as possible. Some of you received the results of my work at the April Chicago User Group meeting. (If you did not get a copy of this information, don't fret; just wait until you finish this article.) Also, copies of these schematics were sent to all parties who assisted me with this project. I received some input from these people I wish to share with you. John Johnson, the author of MENU and the ROS, sent some beta software for MENU and included information to the effect that release 7.4 would be written to auto configure for portable or standard TI systems.

My origional intention was that this portable would take advantage of the TV sets in motel rooms or offices, but I decided to look into LCD TV's (Liquid Crystal Display), and see if a large color LCD TV existed with a video input. There are such units, but the cost is high, so I am waiting

(See Page 34)

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The Printer's Apprentice for MDOS features an all new Picture Editor that takes advantage of the Geneve's large memory and advanced video display processor. The picture-page size has increased from the 256x192 on the 99/4A to 1024x768. This means you can draw and enter text on a full double density size page just by scrolling the 512x192 editing window. You can enter text vertically or horizontally using fonts from TPA, CHARA, TI-Artist(tm) or CGSD(tm). You can use instances or "_P" pictures from TI-Artist clip art libraries. In fact, TPA's enlarged picture-page means you can load up 16 "_P" pictures at once then scroll around and view or edit every pixel of those 16 pictures. Of course, there is no limit to the number of instances, pictures or font characters you can use because its all true WYSIWYG. With TPA's proportionally spaced fonts you can get good looking text without any restrictions on column alignment. You can copy or move any rectangular area around the picture-page and draw, enter text and then print all or any part of the picture-page using TPA's handy Cpixel enlarger. The printing direction may be portrait or landscape(turned sideways). The printing density may be single, double or quad (if your printer supports it.) Additionally, you may single or double strike your printing for the perfect page. You may save all or any portion of the page to diskette in picture format or in TPA "extrn" format for use with the TPA Scheduler. Basic drawing features include lines, polygons, ellipses, curves, and rectangles. A "flood-fill" function allows for easy shading of areas with built-in or user defined shading patterns. A magnify function allows precise editing of any part of TPA's huge picture-page. A number of advanced features such as invert, enlarge, mirror, rotate and translate add powerful capabilities in page creation. We think this is the type of program that the Geneve was made for. TPA for MDOS also includes improvements in the most powerful portion of TPA the Formatter and Scheduler, combining them into single unit. When you really get serious about good looking text there is no program available on 99/4A that does it better than TPA. Now for MDOS on the Geneve, TPA moves page creation into a whole new dimension.

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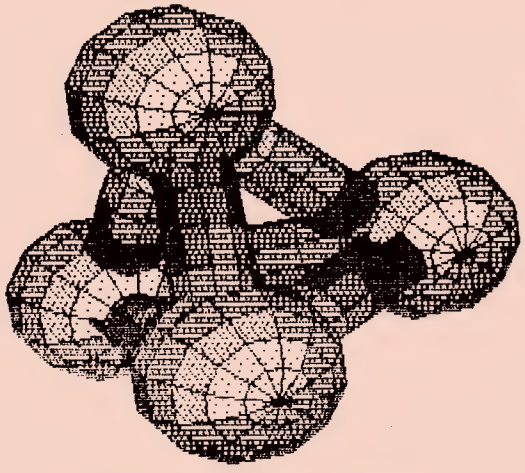

Our products for the 99/4A including The Printer's Apprentice, The Geometer's Apprentice, TPA Toolbox and Business Graphs 99 require: TI-99/4A with 32K memory, Disk System, and TI-Extended BASIC or Editor Assembler. Our products for MDOS including The Printer's Apprentice, The Geometer's Apprentice and TI-Forth for MDOS on the Geneve 9640 by Myarc require version 1.14 of MDOS. All products print on TI-99/4A printer, Gemini 10X and other 100% Epson compatible graphics printers including Panasonic 1091, Star NX and IBM Graphics Printer. When ordering TPA please specify 99/4A or MDOS version.

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THE MAKING OF A TI PORTABLE

(Continued from Page 32)

for technology to catch up with me. When I am able to get what I want, at a reasonable price, I will make a cover that incorporates a LCD TV in it. The bottom of the console will be expanded to include the batteries and power transformer, with a small drawer for a cartridge or two. At present, TI Extended BASIC and the supercart are the only cartridges I use, but I usually take along Video Chess for relaxation.

I have not dwelled on my supercart because so many articles have been written about them. The schematic included here is of a model that has been used for many months, and it is able to successfully store 8 separate programs. It also fits inside a standard cartridge, even with IC sockets included. (See Fig. 3).

So I have finally succeeded in doing what I started out to do. Furthermore, I have made some very good friends in the process, and all of the people who assisted me with this project have had the same attitude about this project, relative to the TI community: *Make the information available to all.* We, as a group, are forever assisting one another, and we form a closer organization by this mutual assistance. I want to thank the following people for their assistance and suggestions to me for making this project a reality:

Jim McCulloch, Jim Derk, Hank Ellermann, Don Jones, Don Walden, Bud Mills, Ron Walters, George Bowman, Mike Maksimik, and Hal Shanafield. A special "thank you" goes to Barry Boone and John Johnson. These names are entered chronologically, and reflect the time period that these people assisted. Obviously, many people helped over, and over. My thanks go out to every one of you. This project is not "Jan Janowski's Portable project," rather it is the TI community's portable project.

Readers who are interested in pursuing this project should send a DSDD disk (two SSSD disks), and a 8x11, postage-paid return envelope to Jan Janowski. He will provide schematics, a copy of P-ROS and MENU software.

Bud Mills, who markets the Horizon RAMdisk, has mentioned that he is considering making a board available for this project. He says that it may be able to use 32K or 128K memory chips. Keep an eye out for this one, as it will make the project a lot simpler.

At the Chicago TI Users' Group's Faire, which is held each November, I will be giving a demo of the portable at one of the breakout meetings, and if you would want some "hands on" access to the portable, feel free to ask to use it. (Who knows what will be in it by then.) For more information on the Faire, check on the Chicago TI Users' Group's BBS at (312)862-0182, for directions and schedule infomation.

If you would want a copy of all these articles, along with photostats of the schmatics used (power supply, RAMdisk, 8-bank supercart, as well as a copy of "The Making of a Portable" article, along with the P-ROS, and "beta" MENU software) send a formatted disk (2 if you are still using SSSD), and 8x11 envelope with return postage for disks and the photostats to: Jan Janowski, TI PORTABLE INFO, 8536 N. Keystone, Skokie, Ill 60076.

I will make copies for you, and send them back. I LOVE MY (PORTABLE) TI.

A CHARACTER GENERATOR FOR GENEVE & TI99/4A

Final installment of source code

This is the third and final installment of CHARA1FIX. Previous installments were published in June and July

The assembly language program, by Wayne Stith, requires a memory expansion, disk system and Editor/Assembler. The program is used to customer CHARA1 files used with TI-Writer, MY-Word and other programs. After creating characters, the program automatically saves the result as a CHARA1 file.

Information on how to assemble and use the program appeared in June and July.

CHARA1FIX

```
0905
0906 QUIT   CLR  @>83C4      Kill ISR hook
0907        BLWP @0          Reset system
0908
0909 * Interrupt routine
0910
0911 MYINT1 CLR  R8                Clear R8 of GPL workspace
0912        LWPI >83C0             Load interrupt workspace
0913        MOV  R13,@INTREG+26    Move return data to my workspace
0914        MOV  R14,@INTREG+28
0915        MOV  R15,@INTREG+30
0916
0917        LWPI INTREG            Load my interrupt workspace
0918
0919        DEC  R10               Decrement timer
0920        JNE  MYEXIT            If not 0, then exit
0921
0922 * Set VDP write address
0923
0924        MOV  *R13,R0           Fetch screen location from main program
0925        AI   R0,>4000          Set first bits to 01
0926        SWPB R0
0927        MOVB R0,@>8C02         Send low byte of original address
0928        SWPB R0
0929        MOVB R0,@>8C02         Send high byte
0930
0931        LI   R10,5             Reset timer
0932        MOV  R8,R8             Check flag for character/cursor
0933        JEQ  MYINTA
0934
0935        CLR  R8                Clear flag for next time
0936        LI   R0,>1E00          Load cursor
0937        JMP  MYINTB
0938
0939 MYINTA MOV  @2(R13),R0        Fetch R1 value from main program
0940        SETO R8                Set flag for next time
0941 MYINTB MOVB R0,@>8C00         Send value to screen
```

(See Page 35)

CHARA1FIX—

(Continued from Page 34)

```
0942
0943 MYEXIT RTWP              Return directly to main program
0944
0945 * Routine to display the character in a grid
0946
0947 BOXWRT DATA >8300,BOX1   Vector; use scratchpad for workspace
0948
0949 * Multiply the character number by 8; add >E000 to obtain the starting
0950 * address for the 8-byte pattern
0951
0952 BOX1   MOV  @CURCHR,R7
0953        MPY  @EIGHT,R7
0954        AI   R8,>E000
0955        MOV  R8,R9         Save starting address
0956        AI   R9,8          Point to beginning of next character's pattern
0957
0958        LI   R0,114+>4000      Top left corner of grid (leading bits
0959 *                               already adjusted)
0960
0961 * Each of the 8 pattern bytes is represented in one line of the grid.
0962 * It is easier to work with the patterns if we handle one nybble at
0963 * a time.  BOXDAT contains the 16 ways in which a nybble can show up
0964 * as a half line. We will take the left nybble first.
0965
0966 BOX4   MOVB *R8,R3        Fetch the byte
0967        SRL  R3,12         Put left nybble in low byte
0968        MPY  @FOUR,R3      Multiply by 4 to obtain an offset for BOXDAT
0969        AI   R4,BOXDAT     Add the beginning of the table
0970        LI   R2,4          Loop counter
0971
0972        SWPB R0            Set VDP address
0973        MOVB R0,@>8C02
0974        SWPB R0
0975        MOVB R0,@>8C02
0976
0977 BOX2   MOVB *R4+,@>8C00  Send 4 bytes to screen (left 1/2 line)
0978        DEC  R2
0979        JNE  BOX2
0980
0981        MOVB *R8+,R3       Fetch same character byte
0982        SRL  R3,8          Place it in the low byte
0983        ANDI R3,>000F      Eliminate everything but the right nybble
0984        MPY  @FOUR,R3      Get an offset
0985        AI   R4,BOXDAT     Add beginning of table
0986        LI   R2,4          Loop counter
0987
0988 BOX3   MOVB *R4+,@>8C00  Send 4 bytes to the screen (right 1/2 line)
0989        DEC  R2
0990        JNE  BOX3
0991
0992        AI   R0,32         Point to next line on screen
0993        C    R8,R9         Gone far enough ?
0994        JNE  BOX4          No
0995        RTWP               Yes, go home
0996
0997 ********************
0998
0999 * Routine to display the current character
1000
1001 LITTLE DATA >8300,LIT1    Vector
1002
1003 LIT1   MOV  @CURCHR,R0    Fetch character
1004        MPY  @EIGHT,R0     Obtain an offset
1005        AI   R1,>E000      Now points to character pattern
1006
1007 * Redefine CHR$(128) by writing this pattern to the pattern
1008 * descriptor table.
1009
1010        LI   R0,128*8+>0800
1011        LI   R2,8
1012        BLWP @VMBW
1013
1014        LI   R0,231        Display the character on screen
1015        LI   R1,128*256    (Not really necessary since the character
1016        BLWP @VSBW         is already there!)
1017        RTWP
1018
1019 ***********
1020
1021 * Routine to display the hex string
1022
1023 HEXDIS DATA >8300,HEX1    Vector
1024
1025 HEX1   MOV  @CURCHR,R5
1026        MPY  @EIGHT,R5
1027        AI   R6,>E000      Point to character's 8-byte pattern
1028
1029        MOV  R6,R9
1030        AI   R9,8          Point to next pattern
1031
1032        LI   R0,>0842      Set VDP address (>0208)
1033        MOVB R0,@>8C02
1034        SWPB R0
1035        MOVB R0,@>8C02
1036
1037 * The 8-byte pattern will show up on screen as 16 numbers/letters.
1038 * Each byte must be broken into two nybbles to display.
1039
1040 HEX2   MOVB *R6,R3            Fetch a byte
1041
1042 * The next instruction not only places the nybble in the low byte, it
1043 * also fills the left bits with zeros, thus making R3 perfect as an
1044 * index value.
1045
1046        SRL  R3,12
1047        MOVB @HEX(R3),@>8C00   Send a byte from HEX to the screen
1048        MOVB *R6+,R3           Get the same byte again
1049        SRL  R3,8              Put the right nybble in the low byte
1050        ANDI R3,>000F          Clean out all but the right nybble
1051        MOVB @HEX(R3),@>8C00   Send a byte to the screen
1052
1053        C    R6,R9             Gone far enough ?
1054        JNE  HEX2
1055        RTWP
1056
1057 * Routine to convert the hex string to DATA and store it
1058
1059 HEXWR  DATA >8300,HEX5
1060
1061 HEX5   MOV  @CURCHR,R5
1062        MPY  @EIGHT,R5
1063        AI   R6,>E000      Point to where the string will end up
1064        MOV  R6,R7
1065        AI   R7,8          Point to the next character's pattern
1066
1067        LI   R0,>0208      Set VDP address for reading the hex string
1068        SWPB R0
1069        MOVB R0,@>8C02
1070        SWPB R0
1071        MOVB R0,@>8C02
1072
1073 * The 16-byte screen string must be converted to 8 bytes.
1074
1075 HEX5A  MOVB @>8800,R3      Fetch one byte from screen
1076
1077        LI   R0,HEX        Loop through HEX until a match is found
1078 HEX6   CB   R3,*R0
1079        JEQ  HEX7
1080        INC  R0
1081        JMP  HEX6
```

(See Page 36)

CHARA1FIX—

(Continued from Page 35)

```
1082
1083 * By subtracting HEX from the value in R0, a true binary value is obtained
1084 * which represents the left nybble of the byte we are creating.
1085
1086 HEX7   LI   R1,HEX
1087        S    R1,R0
1088
1089        SLA  R0,12        Put the value in the far left nybble
1090        MOVB R0,*R6       Store the whole byte
1091
1092        MOVB @>8800,R3    Fetch the next byte from the screen
1093        LI   R0,HEX       Find a match
1094 HEX8   CB   R3,*R0
1095        JEQ  HEX9
1096        INC  R0
1097        JMP  HEX8
1098
1099 HEX9   S    R1,R0        Gets the binary value
1100        SLA  R0,8         Place it in the right nybble of high byte
1101
1102 * The next instruction will set all bits of the target byte pointed to
1103 * by R6 according to the value in the left byte of R0.  Other bits are
1104 * not affected.
1105
1106        SOCB R0,*R6+
1107        C    R6,R7        Gone far enough ?
1108        JNE  HEX5A
1109        RTWP
1110
1111 * Routine to read the grid and update the character pattern stored.
1112
1113 BOXRD  DATA >8300,BOX7
1114
1115 BOX7   MOV  @CURCHR,R7
1116        MPY  @EIGHT,R7
1117        AI   R8,>E000
1118        MOV  R8,R9        Point to beginning of 8-byte pattern
1119        AI   R9,8         Point to next character's pattern
1120
1121        LI   R0,114       Set VDP address to read grid
1122 BOX7B  SWPB R0
1123        MOVB R0,@>8C02
1124        SWPB R0
1125        MOVB R0,@>8C02
1126
1127        LI   R3,8         Loop counter
1128
1129 * To create a byte for the character pattern buffer, each of the 8 bytes
1130 * on a line of the grid must be read. These bytes can be only ASCII 0
1131 * or 8.  If a character is 0, then a bit is cleared in the byte of the
1132 * character pattern to which R8 points.  If the character is 8, a bit is s
et.
1133
1134        LI   R1,>8000     Used to set bits, begins with high bit
1135 BOX7A  MOVB @>8800,R2    Fetch a byte from the screen
1136        JEQ  BOX8         CHR$(0) ?
1137
1138        SOCB R1,*R8       No, set a bit in the buffer
1139        JMP  BOX9
1140
1141 BOX8   SZCB R1,*R8       Yes, turn off a bit in the buffer
1142 BOX9   SRL  R1,1         Move the bit one space to the right
1143
1144        DEC  R3           Done all 8 characters on the line ?
1145        JNE  BOX7A        No
1146
1147        AI   R0,32        Yes, point to next screen line
1148        INC  R8
1149        C    R8,R9        Finished whole grid ?
1150        JNE  BOX7B
1151        RTWP
1152
1153 * Utilities
1154
1155 KSCAN  DATA REGSV,KSC
1156 KSC    LWPI >83E0
1157        BL   @>000E
1158        LWPI REGSV
1159        RTWP
1160
1161 VMBW   DATA REGSV,V1
1162 REGSV  DATA 0,0,0,>8C02
1163        DATA >8C00,0,>8800,0
1164        DATA >4000,>8000,0,0
1165        DATA 0,0,0,0
1166
1167 V1     MOV  R13,R7
1168        MOV  *R7+,R0
1169        MOV  *R7+,R1
1170        MOV  *R7+,R2
1171
1172        SWPB R0
1173        MOVB R0,*R3
1174        SWPB R0
1175        SOC  R8,R0
1176        MOVB R0,*R3
1177        NOP
1178 V2     MOVB *R1+,*R4
1179        DEC  R2
1180        JNE  V2
1181        RTWP
1182
1183 VSBW   DATA REGSV,V3
1184 V3     MOV  R13,R7
1185        MOV  *R7+,R0
1186        SWPB R0
1187        MOVB R0,*R3
1188        SWPB R0
1189        SOC  R8,R0
1190        MOVB R0,*R3
1191        NOP
1192        MOVB *R7,*R4
1193        RTWP
1194
1195 VWTR   DATA REGSV,V4
1196 V4     MOV  *R13,R0
1197
1198        SOC  R9,R0
1199
1200        SWPB R0
1201        MOVB R0,*R3
1202        SWPB R0
1203        MOVB R0,*R3
1204        RTWP
1205
1206 VSBR   DATA REGSV,V5
1207 V5     MOV  R13,R7
1208        MOV  *R7+,R0
1209        SWPB R0
1210        MOVB R0,*R3
1211        SWPB R0
1212        MOVB R0,*R3
1213        NOP
1214        MOVB *R6,*R7
1215        RTWP
1216
1217 VMBR   DATA REGSV,V6
1218 V6     MOV  R13,R7
1219        MOV  *R7+,R0
1220        MOV  *R7+,R1
1221        MOV  *R7+,R2
1222        SWPB R0
1223        MOVB R0,*R3
1224        SWPB R0
1225        MOVB R0,*R3
1226
1227 V7     MOVB *R6,*R1+
1228        DEC  R2
1229        JNE  V7
1230        RTWP
1231
1232 DSRLNK DATA REGSD,D1
1233 REGSD  DATA 0,0,0,0,0
1234 DEVA   DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
1235 DCRU   DATA 0
1236 DSENT  DATA 0
1237 DLEN   DATA 0
1238 DPAB   DATA 0
1239 DVERS  DATA 0
1240 DEV    DATA 0,0,0,0
1241 PERIOD TEXT '.'
1242 HEXAA  BYTE >AA
1243 DFLAG  DATA 0
1244
1245 D1     CLR  @DFLAG
1246
1247        MOV  *R14+,R5
1248        SZCB @SET,R15
1249        MOV  @>8356,R0
1250        MOV  R0,R9
1251        AI   R9,-8
1252        BLWP @VSBR
1253        MOVB R1,R3
1254        SRL  R3,8
1255        SETO R4
1256        LI   R2,DEV
1257 D2     INC  R0
1258        INC  R4
1259        C    R4,R3
1260        JEQ  D3
1261        BLWP @VSBR
1262        MOVB R1,*R2+
1263        CB   R1,@PERIOD
1264        JNE  D2
1265 D3     MOV  R4,R4
1266        JEQ  D88
1267        CI   R4,7
1268        JGT  D88
1269        CLR  @>83D0
1270        MOV  R4,@>8354
1271        MOV  R4,@DLEN
1272        INC  R4
1273        A    R4,@>8356
1274        MOV  @>8356,@DPAB
1275 D4     LWPI >83E0
1276        CLR  R1
1277        LI   R12,>1100
1278 D5     MOV  R12,R12
1279        JEQ  D55
1280        SBZ  0
1281 D55    AI   R12,>0100
1282        CLR  @>83D0
1283        CI   R12,>2000
1284        JEQ  DX
1285        MOV  R12,@>83D0
1286        SBO  0
1287        LI   R2,>4000
1288        CB   *R2,@HEXAA
1289        JNE  D5
1290        A    @DEVA,R2
1291        JMP  D66
1292 D6     MOV  @>8302,R2
1293        SBO  0
```

(See Page 37)

Another approach to a full-screen forth editor

By LUTZ WINKLER

The screens published here are for use with the Advanced Video Processor Card manufactured by Dijit Systems.—Ed

The Text 2 (80-column) mode of the 9938 chip allows the use of 4 colors to be displayed simultaneously. In my original version of a full-screen Forth editor (MICROpendium, June 1988) I used the second set of colors for the blinking cursor. Here is a modified version of the same editor.

Editing functions remain unchanged but the display shows the screen number and the line ruler across the top in a different color (which you may select). The number of the line on which the cursor is currently located is highlighted in the same colors and, of course, the cursor is shown in those colors as well. It no longer blinks but by proper choice of colors it should be easy to see. My normal display colors are grey on white and for the second colors I use black on yellow By altering 1A on line 8 of screen 35 you can set any color you wish. When you leave the edit mode (FCTN-9) the alternate colors are turned off, which gives an immediate indication that you are back in interactive mode.

Screens 36 and 38 are not shown again as they remain the same as before, except that you change EDITORA (2 occurrences on screen 38) to EDITORB to conform to the name I used on screen 34. This was done only to distinguish it from the other version with the blinking cursor.

The only addition is the word HEADR, which you should be able to insert ahead of SCRNF (screen 35). The words that have been modified are: .CUR, RULER, LINE#, SCRNF, UNBLINK, BLINK and QEDIT. (While BLINK and UNBLINK really do not apply in that sense any more, I kept those names.)

```
SCR #34
  0 ( AVPC EDITOR B  - 1//5 CURSOR CONTROL              21JUN89 LW )
  1  BASE->R  HEX
  2
  3
  4  VOCABULARY EDITORB IMMEDIATE  EDITORB DEFINITIONS
  5
  6  : !CUR    0 MAX B/SCR 400 * 1- MIN  R# ! ;
  7  : +CUR    R# @ + !CUR ;
  8  : PTR     SCR @ B/SCR * R# @ 400 /MOD ROT + BLOCK + ;
  9  : R/C     R# @ 40 /MOD ;
 10  : .CUR    R# @ 40 /MOD 3 + SWAP 8 + SWAP GOTOXY ;
 11  : +.CUR   +CUR .CUR ;
 12  : !BLK    PTR C! UPDATE 1 +.CUR ;
 13  : +LIN    R# @ 40 / + 40 * !CUR ;
 14
 15  R->BASE         -->
SCR #35
  0 ( AVPC EDITOR B  - 2/5  SCREEN FORMATTING, NEXT/PREV. SCREEN  )
  1  BASE->R  HEX
  2  : .SCR#    CLS  DUP  SCR ! 3 0 GOTOXY ." SCREEN  " . ;
  3  : RULER    9 1 GOTOXY  7 1 DO 8 SPACES I . LOOP CR
  4             8 2 GOTOXY  6 0 DO ." ----¦----0" LOOP ." ----" ;
  5  : LINE#    0 3 GOTOXY  10 0 DO I 5 .R CR LOOP ;
  6  : LINE.    DO I SCR @ (LINE) I 50 *  F8 + SWAP VMBW LOOP ;
  7  : MLINE    10 0 LINE. ;
  8  : HEADR    1A C VWTR 40 D VWTR A00 DUP 1 7F VFILL 1+ 1 FF VFILL
  9             A15 8 FF VFILL ;
 10  : SCRNF  .SCR# HEADR  RULER  LINE#  MLINE  ;
 11  : NEWSCR  0 SWAP SCRNF !CUR .CUR ;
 12  : +SCR    SCR @ 1+  DISK_HI @ 1- MIN  NEWSCR ;
 13  : -SCR    SCR @ 1-  0 MAX  NEWSCR ;
 14
 15  R->BASE  -->

SCR #37
  0 ( AVPC EDITOR B  - 4/5  ERASE, BLINK, AUTOREPEAT DELAY, QUIT  )
  1  BASE->R
  2  HEX
  3  : .BL  PTR  R/C DROP 40 SWAP - BL FILL ;
  4  : D>END  PAD 40 BLANKS PTR PAD 40 R/C DROP - CMOVE ;
  5  : UNBLINK  A1E F1 0 VFILL ;
  6  : BLINK  CURPOS @ 1+ 8 /MOD A00 + SWAP DUP
  7           0= IF DROP 1- 1  ELSE 100 SWAP SRL THEN SWAP VSBW
  8           CURPOS @ 50 / A * A00 + 1 18 VFILL ;
  9  : DELAY  500 0 DO LOOP ; ( auto-repeat key rate )
 10  : BOX  10F7 10F1 DO 00 I VSBW LOOP ;
 11  : REBOX  10F8 10F0 DO FF I VSBW LOOP ;
 12  : QEDIT  REBOX A00 10F 0 VFILL  0 12 GOTOXY QUIT ;
 13  : CHECK  DUP 1F > OVER 7F  < AND  IF DUP EMIT DUP !BLK
 14                                   ELSE 7 EMIT THEN ;
 15  R->BASE -->
```

To complete the setup for 80-column mode, here are the screens for VLIST and DUMP which were promised in June 1988 but never appeared:

```
SCR #42
  0 ( DUMP ROUTINES  12JUL82 LCT                AVPC mod. 22APR88 LW )
  1  0 CLOAD VLIST   BASE->R HEX
  2 : DUMP8 -DUP
  3       IF
  4         BASE->R HEX 0 OUT ! SPACE OVER 4 U.R OVER OVER
  5        0 DO
  6           DUP @ 0 <# # # # # # BL HOLD BL HOLD #> TYPE 2+ 2
  7          +LOOP
  8          DROP VDPMDE @ 1 = IF 1F ELSE 38 THEN OUT @ - SPACES
  9        0 DO
 10           DUP C@ DUP 20 < OVER 7E > OR IF DROP 2E THEN EMIT 1+
 11         LOOP CR R->BASE
 12       THEN ;
 13
 14
 15 -->

SCR #43
  0 ( DUMP ROUTINES  12JUL82 LCT                AVPC mod. 22APR88 LW )
  1  : DUMP CR 00 VDPMDE @ 7 = IF 10 ELSE 8 THEN U/ >R SWAP R> -DUP
  2         IF 0 DO VDPMDE @ 1 = IF 8 ELSE 10 THEN  DUMP8 PAUSE
  3                 IF SWAP DROP 0 SWAP LEAVE THEN
  4              LOOP
  5         THEN SWAP DUMP8 DROP ;
  6  : .S    CR SP@ 2- S0 @ 2- ." ¦ " OVER OVER = 0= IF
  7         DO I @ U. -2 +LOOP ELSE DROP DROP ENDIF ;
  8
  9  : VLIST   80 OUT ! CONTEXT @ @
 10            BEGIN  DUP C@ 3F AND OUT @ +
 11                 VDPMDE @ 1 = IF 25 ELSE 4A THEN
 12                 > IF CR 0 OUT ! ENDIF
 13                 DUP ID. PFA LFA @ SPACE DUP 0= PAUSE OR
 14            UNTIL DROP ;
 15 R->BASE
```

CHARA1FIX— (Continued from Page 36)

```
1294 D66    MOV  *R2,R2          13Ø2        JNE  D6          131Ø        MOV  R1,@DVERS       1318        BLWP @VSBR       1326        SOCB @SET,R15
1295        JEQ  D5              13Ø3        SRL  R5,8        1311        MOV  R9,@DSENT       1319        SRL  R1,13       1327        RTWP
1296        MOV  R2,@>83D2       13Ø4        LI   R6,DEV      1312        MOV  R12,@DCRU       132Ø        JNE  D9          1328 DX     MOV  @DFLAG,@DFLAG
1297        INCT R2              13Ø5 D7     CB   *R6+,*R2+   1313        BL   *R9             1321        RTWP             1329        JNE  D8
1298        MOV  *R2+,R9         13Ø6        JNE  D6          1314        JMP  D6              1322 D8     LWPI REGSD       133Ø        SETO @DFLAG
1299        MOVB @>8355,R5       13Ø7        DEC  R5          1315        SBZ  Ø               1323 D88    CLR  R1          1331        LI   R12,>ØF4Ø
13ØØ        JEQ  D77             13Ø8        JNE  D7          1316        LWPI REGSD           1324 D9     SWPB R1          1332        JMP  D5
13Ø1        CB   R5,*R2+         13Ø9 D77    INC  R1          1317        MOV  R9,RØ           1325        MOVB R1,*R13     1333 SLAST  END
```

Chainlink

A new addiction for solitaire players

By RUTH O'NEILL
©1989 R. O'Neill

Chainlink is a delightful new program from Genial Computerware. It was written by Walt Howe and Wayne Stith, with documentation by Walt Howe. It is a simulation game, based on the card game Chainlink.

Chainlink is a form of solitaire in which all 52 cards are laid out face up, so there is no element of chance beyond the initial deal. The cards are arranged in 13 columns of 4 cards, and the object of the game, as with most games of solitaire, is to move each suit of cards up to the top of the table in order, starting with the aces. To do this, a player builds "chains" of cards of the same suit in the various columns of cards. It isn't at all hard to play, but there is a fair amount of skill involved in playing it well.

Obviously, it would be possible to play such a game of solitaire with an ordinary deck of cards, but it is much more fun to use this program. Dealing the cards out is painless — they deal themselves out before your eyes very quickly. If you're impatient to begin the game, you can turn off the visible deal and just have the cards appear before instantly, ready for play. Personally, I like to watch the cards slide into position, and it takes only a few seconds.

The mechanics of play are surprisingly simple: The columns of cards are labelled with the letters a-m, and moving a card from one column to the other is merely a matter of pressing first one letter, then the other. The card to be moved slides smoothly and quickly into its new position. If you change your mind before you make another move, the oops key (Fctn-1) puts the card back for you. If you have a lot of cards to move, you don't even have to go to all the trouble of pressing two keys — pressing "R" will repeat your move as many times as you like (or until it is no longer possible, of course).

Overall, it is a carefully planned, effective, and user-friendly interface. The only thing you can't do that you can in a real game is cheat. But, since everybody knows that only the most despicable of card players cheats at solitaire, there's no problem there.

The excellent graphics and pleasant sounds that provide feedback for the player add to the game's enjoyment. It may not be a great game strategy, but I tend to prepare as many cards in order as I can before I press the Enter key and move them to the top of the screen. All those enthusiastic bleeps and bloops and flying cards are immensely satisfying after a lot of careful thought and hard work.

There are other elements to the software package besides just playing the game, though. It is possible to give up on the current game and ask for a redeal at any point. Chainlink will also keep track of your wins during the session for you, so you can see your progress in mastering the game. You can even save your game, although only in the form of the original deal, not your current position. This has other advantages, though: If you make a crucial error and realize it at some point later in the game, you can start over with a game you know is possible to solve. This also helps if you want to practice a particular game to demonstrate to a friend and show off your skill.

The package comes with a large number of saved deals that are guaranteed possible to solve. The only problem I encountered there was minor — the default to load in these games was "DEAL1," while the first game was actually on the disk as "DEAL01." Not too hard to figure out, but irritating, just the same.

DOCUMENTATION: The documentation that comes with Chainlink is excellent. It isn't long, but it doesn't need to be. The instructions are straightforward and clearly presented, and I especially appreciated the tips on game strategy. On the other hand, if you are the type to religiously avoid reading manuals, you still don't have to worry. A summary of the rules is available on screen when you start the game, if you need it.

All in all, I was impressed with Chainlink. I've spent many hours playing it (it is addictive) and look forward to many more. The only real problem I've had so far is that it attracts back seat drivers just like the real thing. Oh, well. I've had more than my money's worth from it.

Look for Chainlink from your local dealer, or you can order it directly from Genial Computerware. Canadian customers should always use money orders for U.S. dollars, since there are often large service charges for cashing cheques drawn on Canadian banks.

Review

Report Card

Performance ..... **A**
Ease of Use ..... **A–**
Documentation ..... **A**
Value ..... **A+**
Final Grade ..... **A**

Cost: $12+$1 S&H
Manufacturer: Genial Computerware, P.O. Box 183, Grafton, MA 01519
Requirements: Disk system, expansion memory and Extended BASIC, TI-Writer or Editor/Assembler cartridge

READER TO READER

Donald N. Andrews writes:

When I first got my TI99/4A one of the first modules I bought was Personal Record Keeping. When I finally got a PE box with a disk drive, PRK became the backbone of my computer. I later learned how to do a lot of the files using Multiplan, but had become accustomed to PRK; I was frustrated, however, by not being able to print records in condensed print using PIO.VARIABLE 132 as the device name for my printer to allow more columns per page.

When the GRAM Krackers came out, I thought I would be able to make this patch in the program and was happy to find the instructions to change the Tax Investment module from RS232 to PIO for the printer option. I felt the patch I needed had to be similar, but I lacked the knowledge to find the input option in order to do any changes.

When Jan Alexandersson provided his disk on the basic program PRK, I waited patiently for my disk to arrive from Sweden. While I did learn a lot about the PRK module from this utility, I was still unable to make the needed patch.

I've been told to use one of the other programs, such as PR Base, to accomplish the same result, but I am now more determined to find if the PRK module can be modified.

Provide comments, suggestions or instructions to Andrews at 478 Catesby Lane, Williamsburg, VA 23185-4733 or (804) 229-4974.

Reader to Reader **is a column to put TI99/4A and Geneve 9640 users in contact with other users. Anyone with a specific problem or question that may be answered by other readers is encouraged to submit an item. Be sure to address it to Reader to Reader, c/o MICROpendium, P.O. Box 1343, Round Rock, TX 78680.**

Personal Auditor Home Accounting System

As much detail as you'll ever need

JOHN KOLOEN

The Personal Auditor Home Accounting System operates like a business accounting system. It uses checking and income ledgers and reconciles both to a general ledger. In many ways, it is at least as complex as many business accounting systems — TI-Count, for example — but as an added bonus allows the user to create and track a budget based on a chart of accounts.

This is not simply a checkbook manager. Although it assumes that most disbursements will be handled through a checking account, that is just the beginning. It also keeps track of income from whatever source, as well as federal, state and local taxes. If you follow the recommendations of author Bill Gaskill, you will even find yourself breaking out your deductible interest payments from principal payments, all this for the sake of accurate record keeping.

Of course, the user determines how extensively he wants to track his revenue and expenditures. It may be that all you want to do is track major expenses — groceries, rent, etc. — and this program will allow you to do just that. But with up to 60 categories in the chart of accounts, the detail-minded budgeters can really home in on specifics.

The program comes on a "flippy" disk, with a floppy-based system on one side, and a hard disk-based system on the other. Both require Extended BASIC and a memory expansion. A printer is highly recommended. I tried it with Epson compatible printers and found no problem. Using a Prowriter I was unable to control the printer, despite my attempts with the printer configuration module. The chart of accounts, for example, always printed out in an elongated character set, regardless of the control characters I entered. With the Prowriter, I wound up printing the chart of accounts to disk and then dumping it to a printer using TI-Writer.

PERFORMANCE: The program consists of about two-dozen modules that load separately from disk. A data disk is required for the floppy version. (A RAMdisk may be used in place of a floppy.) A directory must be created in the hard disk version.

Review

Report Card

Performance	**A**
Ease of Use	**C**
Documentation	**C**
Value	**A**
Final Grade	**B+**

Cost: $20
Manufacturer: Bill Gaskill, 2321 Wintergreen Dr., Grand Junction, CO 81506.
Requirements: Disk system, expansion memory, Extended BASIC, printer recommended, hard disk optional

The main system menu consists of 17 options, ranging from accessing the main input program to outputting a net worth statement. An unusual feature is a calendar editor that allows the user to enter "reminders" that will appear when the program is loaded on the specific date. When loading the program, the user must input a date before he can access the main system menu).

Setting up the program includes defining printer names, as well as pathnames for hard disk use, and, of course, organizing the chart of accounts. The chart of accounts consists of user-defined ledger categories that are flagged by types. These include income, non-deductible expenses, deductible expenses, and transfers of funds from one type of ledger to another. The chart of accounts can also make use of credit cards. Fortunately, for the non-accountants among us, the program comes with a predefined chart of accounts that can be used as is or as a template for customizing.

In addition to defining the chart of accounts, the user also inputs budgetary amounts for each category. The chart of accounts may be changed at any time, though once you start using the system to input expenses and income it's probably not a good idea to deviate too far from what you started with.

Like most commercial accounting systems, Personal Auditor creates files for each month for income and checks written. These are then merged into a general ledger file. By sorting and summarizing the general ledger files the user can create a number of reports, including budget vs actual expenses and income, month to month comparisons and year to date analysis. The data from the ledger is also used to update the net worth file each year.

This program is so extensive in its scope that it's pointless to try to describe in detail how it works. Let it suffice that each expense is recorded by check number, date,

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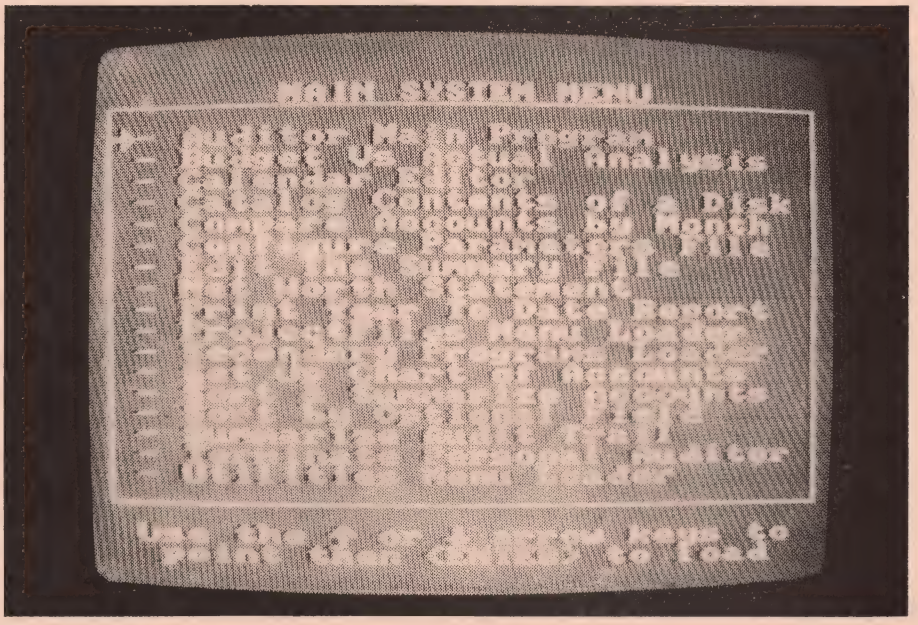


PERSONAL AUDITOR—

(Continued from Page 39)

payee, the chart of accounts category number and a brief description of the transaction. Income is entered in a similar fashion. This is standard operating procedure for an accounting program, and there is no deviation here. In fact, Personal Auditor mirrors in its operations the commercial programs I've used to do business accounting.

Users who crave lots of detail will be satisfied with this program. The audit trail it creates is extensive and the details of transactions can be output to a printer.

EASE OF USE: This program is not easy to use. It badly needs a tutorial. Part of the reason for the difficulty is in the nature of the documentation, but more on that later. If you don't understand the principles of accounting, this program can throw you for a loop. You will definitely need to read the extensive manual, perhaps twice.

DOCUMENTATION: I have seen few manuals that go into greater detail than the thick, 8½x11 manual that comes with Personal Auditor. I have no doubt that it contains enough information to constitute a short-course in accounting. Unfortunately, it is arranged in a manner that makes it difficult and frustrating to use. Rather than being designed in a tutorial or logical fashion, the manual is divided into chapters alphabetically by subject.

For example, if you want to learn how to enter data, you have to turn to the chapter called AddRecords. If you want to learn about the main menu, you have to turn to the chapter called MainMenu, which is in the middle of the manual. In other words, to really use the manual, you first have to know what the terms are and what all the chapter names mean in order to know what chapter to turn to. And it's not all straightforward. As an illustration, the chapter called EditSumFile is about editing summary files but you first have to know what a summary file is before you can use it.

I've spent hours wishing there was a tutorial for this program while trying to learn to use it. It may well be that this program is much easier to use but that the way the manual is organized it just seems a lot harder.

Still, the effort that went into creating and producing the manual deserves respect.

VALUE: At $20 this program is one of the great bargains in the TI marketplace. There is no question in my mind that the author spared neither time nor expense in this effort, and it shows. Although one does not have to take advantage of all the capabilities that this program has to offer, it is designed for those who really want to come to grips with their personal spending habits. These users will give it the time it takes to learn how to thoroughly use this program. And once they have learned it, I have little doubt that they will feel the effort was worth it. For those who aren't so committed to the bottom line, this program would represent a considerable challenge.

MICRO-Reviews

The music is incredible

By HARRY BRASHEAR

Ratings for the software reviewed in this column are based on a star system as follows:

★ Leave it alone, back to the drawing board.

★★ Needs improvement, but workable.

★★★ A good program, worth trying.

★★★★ Send your money and buy it.

Well, surprise, surprise! TIers don't take vacations I guess because the software is still flowing in steadily. This month I'm handing out awards in the Arts and Music categories first. Read on.

★★★★

HARRISON SOFTWARE MUSIC DISKS

We TIers have been blessed with a pretty good chip for music, and once in a while, someone comes along that can get the most out of it. Of course, I'm not a musician, but I do like various kinds of music, and I know *good* when I hear it.

Let me quote you from the introductory letter that I got with the Harrison Software music, it tells it all; "...our music and 'instruments' are not for novelty, rather, to create as closely as possible the original settings intended by the composer."

These music disks have a certain "correctness" about them, in tone and timing, that beats out most everything else that I've heard. For example; I think I have at least two or three versions of *Variations* in my music library. They sound pretty good for synthetic music, but did you know that there are 30 variations to that aria, intended for harpsichord, and that it should last for about 40 minutes. The Harrison version lasts that long, includes them all, and sounds fantastic.

Next, I listened to the *Nutcracker Suite*, not just the overture mind you, but the whole, cotton pick'n show. That was another hour down the tubes. (How do they fit so much music on one disk?) I quote again, concerning this disk... "The *Nutcracker Suite* being an orchestra score, the intention here was to put it a chamber setting as tastefully as possible." I could hardly believe it was coming out of MY computer.

Finally, I got to the Potpourri disk subtitled, "Music Of the Baroque, Galante and Classical." This disk contained 28 pieces of music, all of which were stupendous. Never once did I detect a slipshod bit of programming or a sour note in any piece I listened to.

The people that put these disks together, Dolores Werths and Bruce Harrison, are professionals, one each for programming and music. Also, so that you will better appreciate what you are listening to, there is a file on each disk giving the history of the music stored there-on.

I'll tell you what folks, these people get more than four stars, and my guarantee that you get your money's worth, they get my respect.

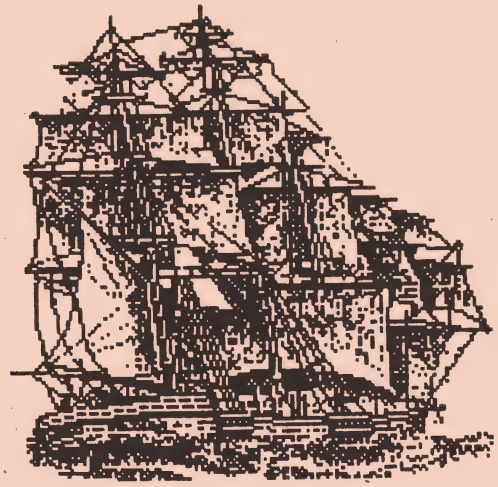
Tell them your disk format and send $4.50 each plus 50 cents postage, for Nut-

(See Page 42)

Ahoy Maties!

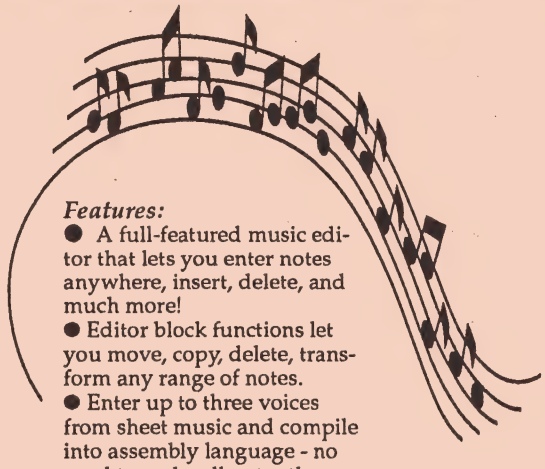
Yo ho ho and a Bottle of Rum! The Captain wants it known, mates, that Disk of Dinosaurs was just a taste of Mr. Gilliland's fertile imagination. He has now made available a package that gives you a little bit of an idea of the life and times of the pyrates of old. Disk of Pyrates is indeed a masterpiece - it is four disks full of pyrate artwork, pyrate fonts, pyrate history, pyrate games, pyrate animation and even a pyrate sing-along! If you always wanted to know more of the exploits of Black Bart, Blackbeard, and the others that sailed the Spanish Main for booty and blood, then this disk is for you. It can't rightly be called just a graphics package because you will learn much about the buccaneers that terrorized the Spanish and laid waste to Merchantman and Naval ship alike. It can't be called a history lesson because the beautiful hand-drawn graphics will find use in your own pyratical works, as well as in calendars and reports. Finally, it can't be called a game even though it is more fun then the law should allow. Even a scurvy dog will realize that it is like nothing else for the TI-99/4A! Disk of Pyrates requires a TI-99/4A with 32K, a disk system and Extended BASIC. TI-Artist is recommended but not required. A TI or Corcomp disk controller is required to view the pyrate animation. At **$14.95,** the great value of this package will warm the heart of even the hardest salt.

Asgard Software
Box 10306, Rockville, MD 20850



Disk Of Pyrates

Music Pro



Features:
- A full-featured music editor that lets you enter notes anywhere, insert, delete, and much more!
- Editor block functions let you move, copy, delete, transform any range of notes.
- Enter up to three voices from sheet music and compile into assembly language - no need to make all notes the same duration between voices! Great for musicians!
- Print out sheet music on Epson or compatible printer.
- Transpose octaves.
- Easily save/load music
- Compiled music can be run independent of program in Extended BASIC!

Music Pro is an amazing MUSIC PROcessor for the TI-99/4A that makes creating music on the 99/4A as simple as typing in sheet music! By David Caron and Lucie Dorais of the Ottawa TI-99/4A Users Group, *Music Pro* allows you to type music directly on a staff - one voice at a time. While editing you can delete, insert, move, copy and even transform and transpose single or whole blocks of notes at a time. Enter up to 400 notes for a single voice. Later, after entering all the voices you can compile them into an assembly language file. *Music Pro* automatically takes care of time differences between the voices - you just concentrate on entering the music and *Music Pro* takes care of the rest! Compiled music can be run from the program or used by itself for games or music programs. Even print out sheet music on an Epson or compatible printer! Requires 32K, Extended BASIC, Disk. *For the TI-99/4A only.*

Suggested Retail:
$17.95
U.S./Canada - Please add $1.00 S&H
Other - Please add $4.00 Airmail

Asgard Software
P.O. Box 10306
Rockville, MD 20850
(703)255-3085

MICRO-REVIEWS

(Continued from Page 40)

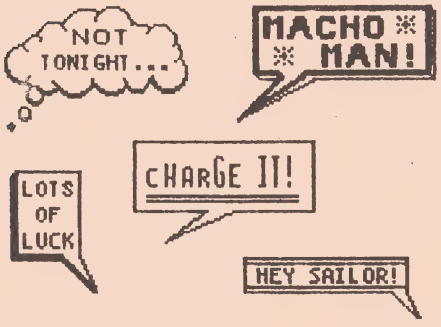
cracker, Variations, or Potpourri, to: Harrison Software, 5705 40th Place, Hyattsville, Md. 20781.

★★★

CAPTIONS

My first impression of this offering was one of pure skepticism, then I looked again and thought, "gadzooks, what a lot of work, but to what end?" Finally, I took the whole thing apart, took a good look at it and decided that there really is a need for CAPTIONS.

If you do posters, newsletters, or any other graphic work, you have need from time to time for something like what I have pictured below.



Kinda cute aren't they? Mr. Andrews has supplied about 200 of these things on two disks, including a list of the wordings in TI-Writer format. If you have need of a phrase, you can look it up alphabetically and get the file name or number. (Usually a number, but the blanks that he has also supplied have alpha designations.)

They are designed for TI-Artist format and are all instances that you can load and place through the Enhancement module. There are 15 blank "balloons" that you can fill in yourself with a font that is also provided.

I looked at a large sampling of the captions and found all of them to be useful and have been well done. They are designed for the lazy among us, and I'm glad I have them in my graphics library. Good show, Steve!

Send $10 to Stephen Andrews, 6 Ralph Place, North Bay, Ontario Canada P1A 1L2.

★★★

JAPANESE STUDIES

Talk about your limited usage programs... here's one to teach you the Japanese language, and how to write it.

Hey, what the heck, isn't that what you bought a computer for, to get help with unusual problems. Here's the story:

Don Shorock bought his TI a long time ago and wanted to learn Japanese. He started out programming lesson drills on it to help him study. The programs got better, and then he discovered the fairware network, so it seemed natural for him to help other people too. The result is a full disk of programs, including a beautiful set of docs, that will teach you to speak to the guys that bought your corporation.

The quizzes are multiple choice and they include the Japanese symbols to select from. There is also a program to print out a selection of 5,000 random sentences to practice on.

I'm a little afraid of under-selling this program so let me give you a rundown of what's on the disk. Keep in mind that this language comprises three forms of writing according to the docs.

1. Five hundred and fifty-eight verb forms in Hiragana, including pronouncer.
2. Two hundred words/phrases in Hiragana.
3. Eighty-eight symbols in Kanji, with pronunciation and meaning.
4. Seventy-seven food words from English in Katakana.
5. Study drill for adjectives.
6. Study drill for verbs.
7. A program to print study sheets for telling time.

...and a couple of other items of similar nature.

I think the concept is pretty neat and the programs work okay. It's just that I don't know how many of us will be beating down Don's door to get it. I think if a TI-Artist font of Japanese symbols were added to the program, it might be more useful to more people. Nevertheless, it's Don's first crack at our community and I think he has done a bang up job on the programs. Most of them will run in BASIC so elementary school teachers might want to look at this for a little classroom diversion.

Send a couple of dollars, a blank disk and an SASE to: Don Shorock, PO Box 501, Great Bend KS, 67530.

SOME NOTES TO FINISH UP WITH

Shirley Slicer, 1101 Purdom St., Olathe KS, 66061 is offering the TI Comparison Shopper for $5. This is a compilation of most of the software now available for the TI, where to find it and the approximate cost. These TI-Writer files consist of 260 sectors, and are alphabetized. There are also sections for hardware, books and miscellaneous stuff like disk boxes. It's a noble effort and no group should be without a copy in their library for the newcomers. They must get permission from Shirley for distribution, however.

I received a copy of two programs recently from Sweden that may spark curiosity among the more adventurous. They are called "Personal Recordkeeping Basic" and "Statistics Basic." If I am interpreting this program correctly, it will allow you to do some pretty fantastic stuff with either of the aforementioned cartridges in the port. The problem is that I have long since given away both of these cartridges so I can't work with them. If a couple smart cookies want to drop me a line, showing me that your qualified, I will send you these disks, but you MUST be ready to go over them carefully and let me know the results of your findings within 30 days.

Finally, will you folks PLEASE send your phone numbers along with your products. I need to call sometimes with questions and it saves the cost of out-of-state information service.

If you would like me to review your software in this column, please send it to the address below, and if you would like it returned, include a SASE. Write to: Harry T. Brashear, 2753 Main St., Newfane, NY 14108.

MAGAZINE HOLDERS

Keep your MICROpendium collection neat and orderly with plastic holders from MICROpendium. The holders are $3 for 12, plus $1 shipping per order. The holders are used with three-hold binders. Use the form on Page 48 to order. Allow 2-4 weeks for delivery.

Newsbytes

Developer package available for Geneve

GENPROG, a program development package for the Geneve 9640 written by Paul Charlton, is available in limited release from Disk Only Software.

GENPROG contains programs that run in the MDOS mode. GENREF documentation — which completes the release — cannot be finished until a stable MDOS is available, according to the manufacturer.

The limited-release package (Package 1) contains GENASM, GENLINK, GENLIB, LIBRARIES and GENMAKE. GENREF will be shipped on completion. The package also may be ordered as Package 2, to be held and shipped on completion of GENREF.

Package 1 sells for $74.95 cash or check, $79.95 credit cards, shipping $5. Package 2 sells for $69.95 cash or check, $74.95 credit cards, shipping $5.

GENASM is a macro assembler, GENLINK is a linker, GENLIB is a program for maintaining code libraries for the linker, LIBRARIES contains commonly used routines for 99/4A and MDOS programmers, GENMAKE is designed to allow an author to keep track of file dependencies in programs and large documents and GENREF is the MDOS programming environment documentation.

For further information or to order, write Disk Only Software, P.O. Box 244, Lorton VA 22079 or contact DOS on Delphi or 74405,1207 on CompuServe. Order line number is 1-800-736-4951.

New ColumnText version released

Version 4.2 of ColumnText is now available, according to the author, Ron Prewitt.

Version 3.2 was reviewed in the MICROreviews column in the June 1989 MICROpendium.

Enhancements in the new version include two-column condensed printing, pagination and hard-drive access.

Prewitt says registered users can obtain the new version by sending him $1.50 for disk and postage. Others who would like to order the program are asked to send $5 for the program plus $1.50 for the disk and postage.

Write Prewitt at 6429 South Fife, Tacoma, WA 98409.

Central Illinois show set for Sept. 9

The Central Illinois Computerfest, an annual nonprofit event supporting all brands of personal and business computers, is scheduled for Sept. 9 in the Decatur Civic Center, Decatur, Illinois.

Vendor spaces rent for $50. Tables will be provided.

For further information, contact Helen Logan, (217) 429-1809 or Jim Haws, (217) 963-2607.

Designer Labels upgrade released

Designer Labels v.2.4 has been released by Texaments.

This is an upgrade of a utility that allows TI-Artist instances to be printed repetitively on mailing labels and various card stock.

The new version has the abiity to print instances in both single and double-size formats, track multiple prints and abort at any time during the process, according to the manufacturer. The "__I" extension is now automatically assumed by Designer Labels when loading instances. Also, the manufacturer says program and loading time and double-density printing time have been reduced.

Owners of earlier Designer Labels releases may upgrade to v.2.4 by returning their original disk along with a check or money order for $3. Anyone who purchased Designer Labels after July 1, 1989, may upgrade to v.2.4 for $1.25 if a dated sales receipt accompanies the request. Upgrade fees include the newly revised program, a manual addendum and shipping charges. All upgrades are being handled directly through Texaments.

When upgrading, users may purchase the Designer Labels Companion products, also from Texaments, at a special reduced rate not available without the upgrade. Designer Labels Companion #1 is available for $8.95 and Designer Labels Companion #2 is available for $6.95, and both together are available for $14.90. A $2.50 shipping charge must be added if Companion products are ordered.

To upgrade or for information, contact Texaments, 53 Center St., Patchogue, NY 11772 or (516) 475-3480 (voice) or (516) 475-6463.

Longview user group to have fair booth

The Longview Computer Users Group will participate in the Gregg County Fair in Longview, Texas, Sept. 12-17.

The user group, which has special interest groups for various computers, is an outgrowth of the Longview TI99 Users Group. The group has more than 300 members and operates a bulletin board and newsletter.

More than 100,000 persons are expected to attend the Gregg County Fair, according to Leo W. DuBry of the Longview group.

For further information, write DuBry at DuBry's Photography, 325 S. Center St., Longview, TX 75651.

Board in production

Eric Zeno says the "Internal Board," also known as the "Zenoboard," is now being manufactured in quantities of 100.

According to Zeno, the board allows the user to add 32K memory, a clock circuit, Extended BASIC and the Speech Synthesizer to the interior of the TI console.

The boards are $17.50 each. Documentation, approximately eight pages of schematics, builders' notes, parts list, software for the clock and parts placement overlay, is available for $1 per copy.

Shipping is $2.50 for the first board in the U.S. and 50 cents for each additional board. In other countries, shipping is $8 for the first board and $6.75 for each additional board. All prices are U.S. currency.

Zeno says the board includes three additional, switched GROM sockets. Any circuit configuration can be used. The board requires no additional power and is compatible with all other known hardware and software, he says. He says the board eliminates nearly all lockups caused by the

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Newsbytes

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Extended BASIC cartridge. In addition to soldering component connectors, only 12 additional wire connections have to be made to build a complete board, Zeno says.

Switches may be added to turn off any or all circuitry and there is a GROM reset switch, he says. Small modifications must be made to the plastic on the inside of the console and hand soldering skills are recommended.

Overseas shipping may require additional invoicing, he notes.

For information, or to order, contact Zeno at 414 Highland RD., Pittsburgh, PA 15235 or (412) 371-4779.

Memory expansion created for Geneve

Bud Mills Services is offering a new memory expansion for the Myarc Geneve 9640. The memory expansion has been designed and developed by Ron Walters of Dynamic Systems Research Inc. and will be produced by Horizon Computer.

The memory expansion ''MEMEX'' uses the more economical 1 meg dynamic memory chips. The MEMEX uses a new refresh circuit design and automatic detection of other cards that may cause bus conflicts, according to the manufacturer. The card will support ''zero wait state'' operation and is fully socketed for expansion up to 1.5 meg (greater than 504K requires a minor modification on the Geneve).

The fully constructed tested and warranted 504K MEMEX is priced at $245. No kits are available because of a timing adjustment that is required.

For information or to order, write Bud Mills Services, 166 Dartmouth Dr., Toledo, OH 43614.

EXEC loads E/A files from MDOS

Barry Boone is offering a Fairware program that allows Geneve users to load most assembly language programs from MDOS, without having to load the GPL interpreter. Called EXEC, the program allows programs such as Telco, Archiver and others that load from Option 5 of the Editor/Assembler directly from the MDOS prompt without using TI-MODE.

Boone has also upgraded his Archiver program to Version 3.03G. This version includes a previous patch that fixes a timing problem when running Archiver out of the Geneve. (The fix was published in the July issue of MICROpendium.) Another modification allows the program to be used with the Myarc Hard & Floppy Disk Controller when the HFDC is used to control both hard and floppy drives. This is a configuration that is used by few users, however.

EXEC may be downloaded from bulletin boards, or send Boone a floppy disk, and postage-paid return mailer. His address is Box 1233, Sand Springs, OK 74063.

Asgard introduces three new programs

Asgard Software is offering three new products. They are Legends II, MDOS Conversion Notes and HardMaster.

Legends II is a continuation of the Legends series. The scenario starts with a shipwreck that leaves the player stranded on an island. The object is to explore the island in order to raise funds for passage home. The 3-disk adventure has new graphics, spells and monsters. Written by Donn Granros, the program requires Extended BASIC, memory expansion and a disk system. Suggested retail is $17.95.

MDOS Conversion Notes is a package to aid assembly language programmers port software from the TI99/4A to the Geneve. Consisting of a book and software, it includes utilities for MDOS that are analogs to 99/4A assembly programs. According to Asgard, ''with the aid of the documentation they can easily be linked to your own 99/4A programs.'' Fully commented source code is included and may be used without a license. An MDOS linker is included. It requires a disk system and Editor/Assembler or equivalent software. A Geneve is recommended. Suggested retail is $12.95.

HardMaster is a hard disk sector editor for use with the Myarc Hard & Floppy Disk Controller. It features an editor that lets users edit up to four sectors at a time; sectors may be dumped in both ASCII and hex to a printer; a Tree function that lists all directories and their files with sector information on each; and the ability to dump the bitmap or sector allocation table to a printer. Other standard sector editor functions are also supported. The program can be used to repair corrupted files or recover lost directories on hard disks.

The program is is compatible with the 4A and the Geneve. TI users must have expansion memory. It runs out of Editor/Assembler on both machines. The program was written by Colin Christensen. Suggested retail is $14.95.

To order, or for more information, contact Asgard Software, P.O. Box 10306, Rockville, MD 20850, (703)255-3085. Mastercard and Visa are accepted.

***Newsbytes* is a column of general information for TI and Geneve users. Information from manufacturers is welcome. Illustrations and photographs will be used when space permits. Send items to MICROpendium Newsbytes, P.O. Box 1343, Round Rock, TX 78680.**

USER SUPPORTED SOFTWARE

***User Supported Software* is noncommercial software written and distributed by readers. Anyone wishing to submit an announcement is encouraged to send a copy of the program or product as well as a description to MICROpendium. MICROpendium cannot take responsibility for items that appear in this column.**

PICASSO COMPANION 2

Several pictures, fonts and borders for use with Picasso Publisher. Includes docs and a Picasso reference guide. $10 donation. Send SS/SD flippy.

HOME FILER 2.1

Data manager for the home. General and "phone book" database, text file viewer and memo writer, with docs. $10 donation. Send SS/SD flippy.

DV MANAGER 80

A system that provides simple manipulation of text files. Copy, view, print files. Compare or catalog disks. $5 donation. Send SS/SD flippy.

PHANTAM OF THE OPERA

A musical mix of songs from the Broadway show. Includes a tutorial on programming music. $5 donation. Send SS/SD.

The above programs require memory expansion and Extended BASIC. Send 1 disk as noted for each program plus 60 cents per disk for postage. Donations are requested by not required. Send to Andy Frueh, 638 Maplewood Dr., Lima, OH 45805, (419)222-6819.

User Notes

VALUE-able function

We thought everybody knew this, but since it appeared in Newsletter Nine-T-Nine of the Toronto Users Group we'll reprint it here. The author is Jim McLaren, and the item originally appeared in the Sudbury 99ers newsletter. He wrote:

When I was inputting data into Multiplan I had several entries for one category. I used the calculator to add them all up before I entered the data. Then I thought — *why not let Multiplan do the work for me.* I selected (V)alue and then entered the following numbers into a cell: 5.67+4.32+9.09. Press enter. Multiplan gave me the total, plus when the cell is highlighted again the formula remains intact.

At our monthly meeting I mentioned that you could add figures up into one cell. No one in the group was aware of that. So, we tried all the math functions. And they worked."

Using (V)alue when inputting numbers is handy when budgeting or keeping track of expenses. Say you have a category called Groceries that you track each month. By using (V)alue, you can enter each expenditure as it occurs. The result will be a running total which, when edited, will reveal each expenditure. By simple editing, you can even get an average per expenditure, as well as a count of the number of expenditures. All of this from that single cell.

Why reformat a hard disk?

Is there a need to reformat a hard disk?

The answer is yes, and the frequency of reformatting depends on the quality of the hard disk as well as the environment it is in.

Inexpensive hard disks, such as the Seagate 225, 238 and 251, and others that lack shock mounting, are the touchiest. When mounting them in enclosures make sure they are mounted firmly, but don't tighten the mounting screws too tight (this can cause stress on the head disk assembly).

The biggest problem with inexpensive drives is in the stepper motor (voice coil drives don't have these problems). Variables ranging from ambient temperature, to power fluctuations to case flexing can eventually result in a failure of the stepper motor hard disk.

This isn't a "hard" failure or crash. Rather, the symptoms of the problem are read/write errors. Your hard disk will be slow in reading or writing, or you'll see error messages notifying you that you can't write to or read from the hard disk. Usually this will be transient, so that when you try to read or write a second time, or power-down and then power-up, everything will seem to be normal. At this point, however, you definitely want to be thinking about backing up your hard disk and reformatting it. If you ignore these symptoms too long, you might find yourself losing Sector 0 and have no choice but to reformat.

You should know that the problem isn't in the software you use but in mistracking. In other words, the hard disk gradually loses its ability to write data precisely where the track and sector identification marks are located, which are laid down when formatting the drive. The data instead gets written across these reference points.

There really is no way to avoid this type of problem. (Better drives that also use stepper motors minimize these problems by isolating the head disk assembly with rubber shock mountings, but even these will require formatting every 1-2 years.) There isn't a hard disk made that at some point won't experience these problems. It is just a matter of time before they show up.

As a rule of thumb, with inexpensive drives, you may need to reformat every 12 months if you don't experience read/write problems — more frequently if you do. And if you move around a lot or environmental conditions are not ideal — fluctuating temperatures, smoke, etc. — you may want to reformat every six months just to be on the safe side.

An advantage to reformatting is that read/write operations will be faster. That's because data and programs are fragmented when first written to the hard disk. After reformatting, the files are rewritten to the hard disk contiguously so that fragmentation doesn't appear until additional files are written to the disk.

CHARA1FIX correction

This comes from Wayne Stith, author of the CHARA1FIX program published in the June-August editions. He writes:

One correction to my CHARA1FIX article: The 6-byte header found at the beginning of PROGRAM files indicates among other things where the file should be placed in CPU RAM, not VDP RAM; thus this information is of little use for CHARA1 files which are meant to stay in VDP. Where a file is placed during the load process is dependent on the information in the Peripheral Access Block (PAB).

SEB & EA & GK

This item, by Barry Ensley, appeared in TopIcs, the newsletter of the LA 99ers.

Own a GRAM Kracker and Super Extended BASIC?

Or, are you presently using GK Extended BASIC with the Editor/Assembler *attached* using the XBEA Patch program from Danny Michael's BK Utility I disk?

Would you like to use the same setup, but replace GK-XB with SEB? I couldn't find a means of accomplishing this task.

After some exploring, I discovered that all the E/A material appeared to reside in the third file of the saved GK-XB and E/A module. As an example, let's assume I had saved the GK-XB and E/A module as GKXB&EA. The file called GKXB&EA2 is the one in question.

With this little information in hand, I decided to try something. I had SEB saved, unlikely as it seems, with the filename SEB. I renamed the file GKXB&EA2 as SEB2 and proceeded to load my new SEB module.

To my surprise and delight, there appeared on the menu screen both Super X-BASIC and Editor/Assembler. And not only were both there, they both seemed to work perfectly.

That was a number of months ago, and my new SEB&EA module is still working without fault. I don't guarantee there aren't problems just waiting to crop up. However, my limited knowledge of this area, logic and experience seem to bear out that this simple technique has allowed the combo of

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User Notes

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SEB and E/A and GK to exist.

To review:

1. Save Super Extended Basic with the GRAM Kracker.

2. Take your GRAM Kracker Extended BASIC and Editor/Assembler saved module (a backup copy, of course), as accomplished with the GK Utility I XBEA program, and rename the third file (ending with 2) to match the name of the third file of the SEB saved module.

3. Load and then resave the resulting module under a new name.

That's all there is to it. (Note: The GK-XB you use can be enhanced beyond what the Utility I package did. Also, I do not have the actual Editor and Assembler programs residing in GRAMs 1 and 2, and part of the module space. I haven't investigated this, but I feel certain that this feature can't be retained.)

Things to do when your console locks up

John Guion, developer of Multi-Mod, wrote the following item as part of a column on curing console problems. The column appeared in the newsletter of the Dallas TI user group. The portion published here is submitted "Intermittent Console Lock-up."

Occasionally, a console will suffer from lock-up during regular use of software. This may be caused either by a software error, a hardware error, or a disturbance of the system. Assuming that software errors and outside disturbances (such as bumping the flex-cable connector) have been eliminated as possible causes, several conditions may cause random locking up of the console during use.

Cures for random console lock-up fall into three main categories: Power supply, heat, and poor connections.

Possible Causes and Solutions

► Check the computer's supply line voltage. The transformer input should be approximately 117 VAC. The output of the console's internal supply should be +5V, +12V, and −5V. Approximately 5 percent variation for each of these is tolerable.

► Test the computer in different surroundings. If the computer consistently works at another location or with different equipment attached, it may be affected by some components connected to it or by electrical interference from the 117 VAC supply.

► If lock-up occurs only after some period of use, the problem may be heat related. Make sure the console's ventilation slots are not blocked. Check the heatsink of the TMS9918A chip for sufficient heat-conducting grease as well as the TIM9904 if it has a heatsink attached. A cooler switching power supply may be installed to help further lower operating temperature.

► If the console fails to run certain modules reliably (such as Extended BASIC) and such modules often need reseating several times, the GROM port should be changed. This typically occurs with modules that use contacts on both sides of the edge connector in the module, as is the case with Extended BASIC. Cleaning the GROM port may also help, but the problem will probably appear again shortly unless a new port is installed. (For parts information and prices, call Texas Instruments at 806-741-2265.—Ed)

When replacing or cleaning the port, be sure to remove the felt or foam wiper from the clip-on cover to the port. The wiper may be removed with a small screwdriver and solvent. Replace the plastic cover once the wiper material has been removed. *Do not* use any type of lubricant, since this will attract dirt and cause further problems.

► A poor connection at the console's I/O port on the side may also lead to occasional problems. If problems persist after checking for a secure connection, remove any device connected to the side port and use alcohol and a stiff piece of paper to clean the inner contacts on the device.

Remove the main board from the console and clean the edge connector with a pencil eraser, followed by wiping with an alcohol-treated pad. Only light rubbing is needed with the eraser to remove surface oxidation and produce a clean surface. Excessive rubbing will not help and may remove too much plating from the board, especially if this procedure is repeated several times.

► Check the power plug at the back of the console for tightness. A loose connection may cause occasional power failure. If this plug is loose, use pliers or another suitable device to bend the pins in the receptacle *slightly* towards each other. A small piece of electrician's tape around the plug will also help secure the connection.

Disable switch for Horizon RAMdisk

This item was produced by Bud Mills Services, which markets the Horizon RAMdisk.

This modification provides a method to turn off (or hide) the HRD from the rest of the system. This switch allows you to turn off the RAMdisk in the event of a system crash when the computer locks up. With the card turned off, you can power-up the console and PEB, turn the card back on and proceed to re-load the operating system. No need to remove the batteries to erase the contents and, in most cases, the files may be recoverable. Other reasons for "hiding" the card could be a conflict between the RAMdisk and a program you want to run. Or, you may wish to keep the kids out of it.

• Remove the voltage from pin 6 of U20 (serial 1999 and below) or U20A (HRD+, 2000 and up) and reconnect it via a resistor (1K-10K will do) through a SPST switch to ground (see illustration on Page 47).

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SUPER EXTENDED BASIC OWNERS!
Have four modules in one with:

MULTI-MOD

The MULTI-MOD is a plug-in upgrade for owners of Triton's Super Extended BASIC module that gives you SEB, Editor/Assembler, Disk Manager III, and TI-Writer ALL IN THE SAME MODULE! It may be the only module you'll ever need!

The price of the upgrade kit is $22.95 and includes a manual and disk with the Editor/Assembler and TI-Writer support files. A free brochure is available on request from:

John P. Guion
P.O. Box 4628
Lubbock, Texas 79409

Also ask about TI RS232 and Disk Controller upgrade kits.

(Super Extended BASIC is a trademark of Triton Products Company)

Classified

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User Notes

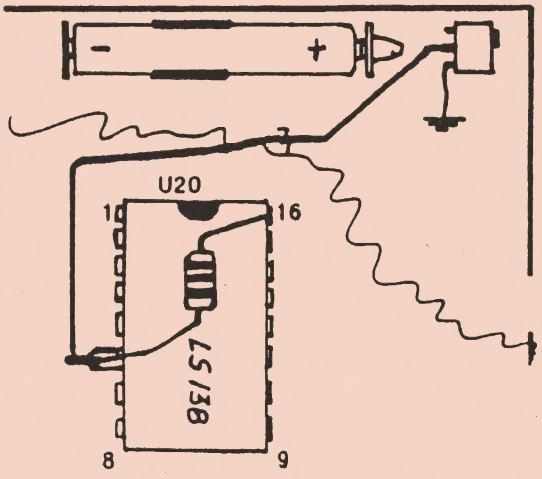
(Continued from Page 46)

Closing the switch pulls the pin low and shuts off the CRU access at U20.

• Bend out pin 6 of the chip, attach enough wire to reach the switch and connect the resistor from this pin to pin 16 of the same chip. Run the other end of the wire to the switch.

• Mount a miniature Single Pole Single Throw switch at the top back edge of the card. Run a lead from one pole to a nearby ground.

Note: The HRD+ circuit board on cards with a serial number below 1999 required stacking of U20. Attach the wire and resistor to the top chip's pin 6 and cut off the bottom end.



User Notes **is a column of tips and ideas designed to help readers put their computers to better use. The information provided here comes from many sources, including TI user group newsletters. MICROpendium pays $10 for any item sent in by readers that appears in this column. Mail *User Notes* to: MICROpendium User Notes, P.O. Box 1343, Round Rock, TX 78680. Or post them to us on CompuServe, Delphi or Genie.**

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